Service Manual

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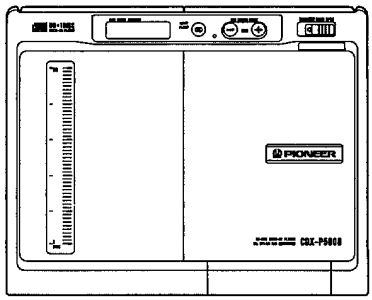

ORDER NO.
CRT1914

50-DISC MULTI-CD PLAYER

CDX-P5000 UC,EW,ES

COMPACT disc DIGITAL AUDIO

- **See the separate manual CX-642(CRT1927) for the CD mechanism description, disassembly and circuit description.**
- **The CD mechanism employed in this model is one of CX-642 series.**

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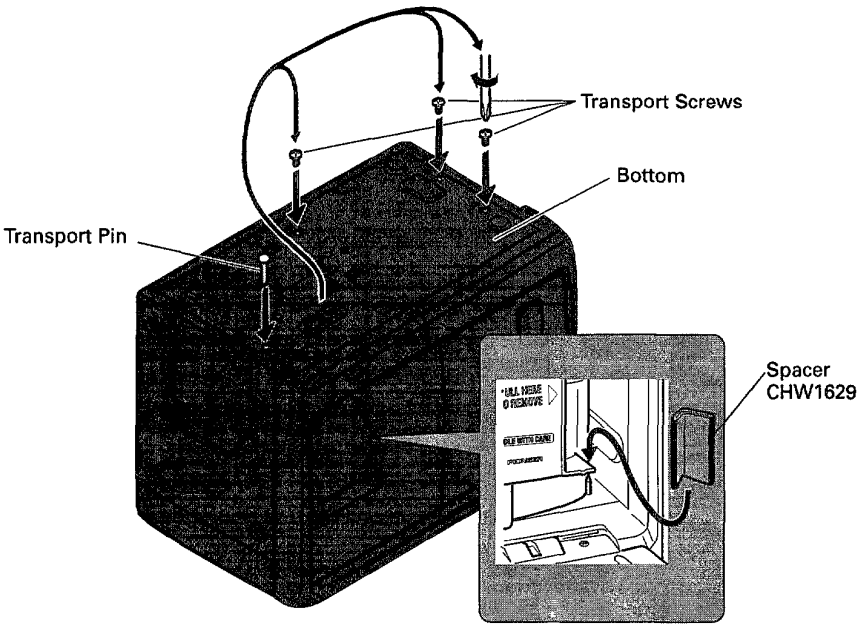
● CD Player Service Precautions

1. For pickup unit(Service)(CXX1230) handling, please refer to"Disassembly"(CX-642 Service Manual CRT1927).
   During replacement, handling precautions shall be taken to prevent an electrostatic discharge(protection by a short pin).
2. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.
3. Please checking the grating after changing the pickup unit(see page 30) since these screws protects the mechanism during transport, be sure to affix it when it is transported for repair, etc.



When retransporting the unit, use the following procedure, installing the transport screws, pin and its cardboard retainer in the positions they were in when the unit was first transported.

1. **Switch the power on.**
2. **Press ⑩ while pressing the Clear button.**
3. **Release the Clear button and release the ⑩.**
4. **Open the door (magazine side).**
   If the Procedure is correct, "------" will be displayed for the player display's disc number display.
5. **Disconnect the Power Cord and the IP-BUS cable.**
6. **Bottom where the transport screws are installed.**
7. **Place the magazine inside.**
8. **Install the transport screws and pin.**
9. **Install the cardboard retainer on the transport pin.**

Fig. 1

1. SAFETY INFORMATION

1.1 CDX-P5000/UC

CAUTION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer.
Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty.
If you are not qualified to perform the repair of this product properly and safely; you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5).
When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

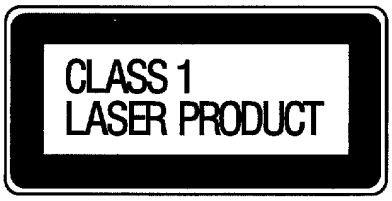
1.2 CDX-P5000/EW

1. **Safety Precautions for those who Service this Unit.**
- **Follow the adjustment steps (see pages 28 through 33)in the service manual when servicing this unit. When checking or adjusting the emitting power of the laser diode exercise caution in order to get safe, reliable results.**

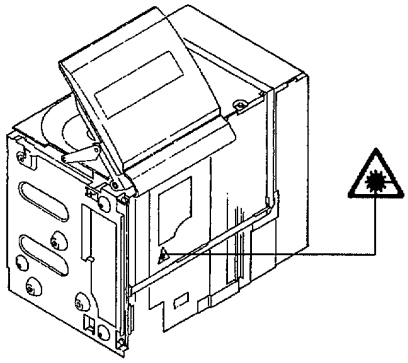
Caution:

1. **During repair or tests, minimum distance of 13cm from the focus lens must be kept.**
2. **During repair or tests, do not view laser beam for 10 seconds or longer.**

2. **A "CLASS 1 LASER PRODUCT" label is affixed to the rear of the player.**



3. **The triangular label is attached to the mechanism unit frame.**



4. **Specifications of Laser Diode**

Specifications of laser radiation fields to which human access is possible during service.
Wavelength = 800 nanometers

2. EXPLODED VIEWS AND PARTS LIST

2.1 PACKING

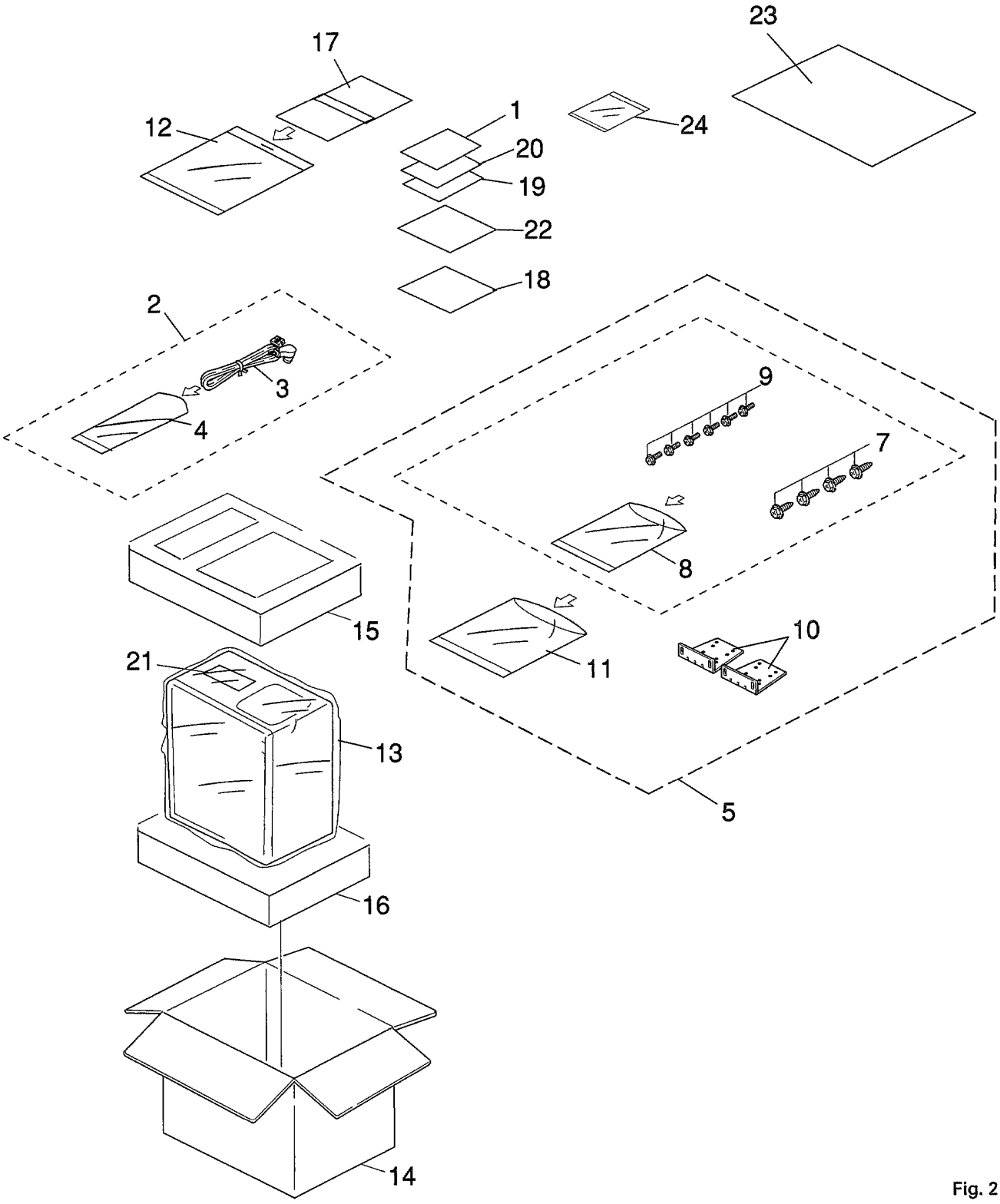


Fig. 2

NOTE:

● Parts marked by "＊"are generally unavailable because they are not in our Master Spare Parts List.

(1) Parts List

Mark	No.	Description	Part No.
＊	1	Warranty Card	See Contrast table(2)
＊	2	Accessory Assy	See Contrast table(2)
	3	Cord	See Contrast table(2)
	4	Polyethylene Bag	CEG1172
＊	5	Accessory Assy	CEA2312
	6	Screw Assy	CEA2252
	7	Screw(x4)	CBA1295
＊	8	Sheet	CNM4338
	9	Screw(x6)	HMF40P080FZK
	10	Angle(x2)	CNB2030
＊	11	Polyethylene Bag	CEG1163
	12	Polyethylene Bag	See Contrast table(2)
	13-1	Polyethylene Bag	See Contrast table(2)
	13-2	Spacer	CHW1629
	14	Carton	See Contrast table(2)
	15	Protector	CHP1878
	16	Protector	CHP1879
	17	File	See Contrast table(2)
	18	Owner's Manual	See Contrast table(2)
	19	Installation Manual	See Contrast table(2)
＊	20	Card	See Contrast table(2)
＊	21	Caution Card	CRP1151
	22	Owner's Manual	See Contrast table(2)
	23	Spacer	CHW1625
	24-1	Polyethylene Bag	CEG1099
	24-2	Caution Card	CRP1090

(2) Contrast of CDX-P5000/UC and EW,ES.

CDX-P5000/UC and EW,ES have the same construction except for the following.

Mark	No.	Description	CDX-P5000/UC Part No.	CDX-P5000/EW Part No.	CDX-P5000/ES Part No.
＊	1	Warranty Card	•••••	CRY1087	•••••
＊	2	Accessory Assy	CEA2311	CEA2313	CEA2311
	3	Cord	CDE5055	CDE5054	CDE5055
	12	Polyethylene Bag	CEG1185	•••••	•••••
	13-1	Polyethylene Bag	CEG1224	CEG1223	CEG1223
	14	Carton	CHG3110	CHG3109	CHG3108
	17	File	CHV1001	•••••	•••••
	18	Owner's Manual	CRD2285	CRD2156	CRD2286
	19	Installation Manual	CRD2155	CRD2287	CRD2160
＊	20	Card	ARY1048	•••••	•••••
	22	Owner's Manual	•••••	CRD2157	•••••

● Owner's Manual

Part No.	Model	Language
CRD2285	CDX-P5000/UC	English, French
CRD2156	CDX-P5000/EW	English, French, Italian
CRD2157	CDX-P5000/EW	German, Dutch, Spanish
CRD2286	CDX-P5000/ES	English, Spanish, Portuguese, Arabic

● Installation Manual

Part No.	Model	Language
CRD2155	CDX-P5000/UC	English, French
CRD2287	CDX-P5000/EW	English, French, Italian、German, Dutch, Spanish
CRD2160	CDX-P5000/ES	English, Spanish, Portuguese, Arabic

2.2 EXTERIOR

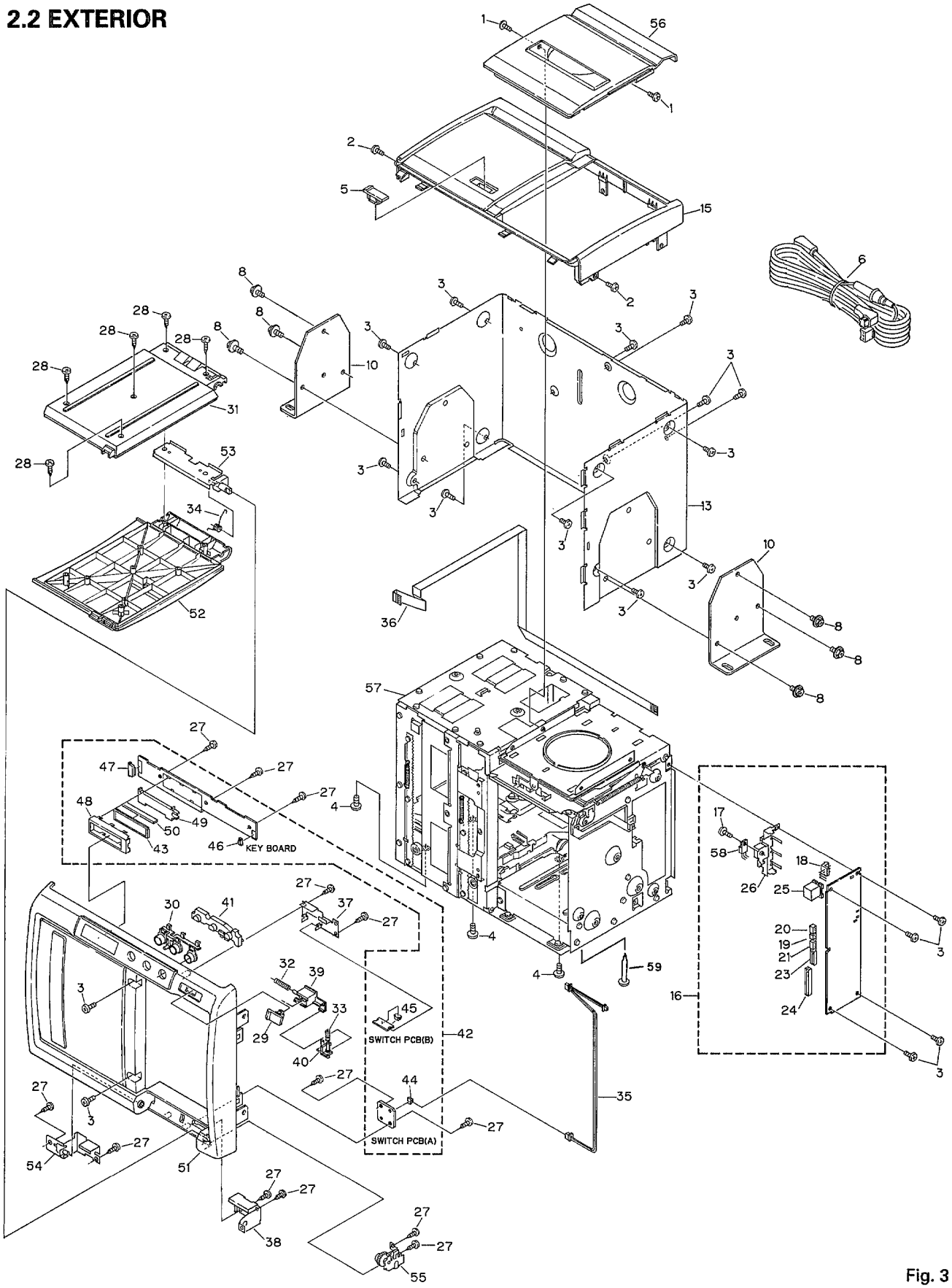


Fig. 3

(1) Parts List

Mark No.	Description	Part No.
1	Screw	BMZ26P050FZK
2	Screw	BMZ30P050FMC
3	Screw	BMZ30P050FZK
4	Screw(Transport)	BMZ40P050FRD
5	Button	CAC4665
6	Cord	See Contrast table(2)
7	·····	
8	Screw	HMF40P080FZK
9	·····	
10	Angle	CNB2030
11	·····	
12	·····	
13	Case Unit	CXB1353
14	·····	
15	Grille	See Contrast table(2)
16	System Unit	CWX1952
17	Screw	BMZ26P060FMC
18	Plug(CN1501)	CKS-460
19	Plug(CN1904)	CKS1035
20	Plug(CN1903)	CKS1036
21	Plug(CN1902)	CKS1037
22	·····	
23	Connector(CN1901)	CKS2761
24	Connector(CN1701)	CKS2779
25	Connector(CN1801)	CKS3407
26	Holder	CNC6330
27	Screw	BPZ26P080FMC
28	Screw	BPZ26P080FZK
29	Button	CAC4666
30	Button	CAC4667
31	Door	CAT1750
32	Spring	CBH1870
33	Spring	CBH1871
34	Spring	CBH1873
35	Cord	CDE4927
36	Connector	CDE4929
37	Holder	CNC6391
38	Holder	CNC6569
39	Lever	CNV4515
40	Lever	CNV4517
41	Lighting Conductor	CNV4519
42	Key Board Unit	CWX1992
43	LCD(LCD901)	CAW1356
44	Connector(CN912)	CKS2191
45	Connector(CN913)	CKS2191
46	Connector(CN902)	CKS2193
47	Connector(CN901)	CKS2411
48	Holder	CNC6392
49	Lighting Conductor	CNV4518
50	Connector	CNV4520
51	Grille Unit	CXA9066
52	Door Unit	CXB1249
53	Holder Unit	CXA9077
54	Holder Unit	CXA9078
55	Damper Unit	CXA9099
56	Door Unit	CXA9067
57	Mechanism Unit	CXK4300
58	Transistor(Q1503)	2SB942
59	Pin	CLA2163

(2) Contrast of CDX-P5000/UC and EW,ES.

CDX-P5000/UC and EW,ES have the same construction except for the following.

Mark No.	Description	CDX-P5000/UC Part No.	CDX-P5000/EW Part No.	CDX-P5000/ES Part No.
6	Cord	CDE5055	CDE5054	CDE5055
15	Grille	CNS4148	CNS4147	CNS4148

2.3 CD MECHANISM UNIT

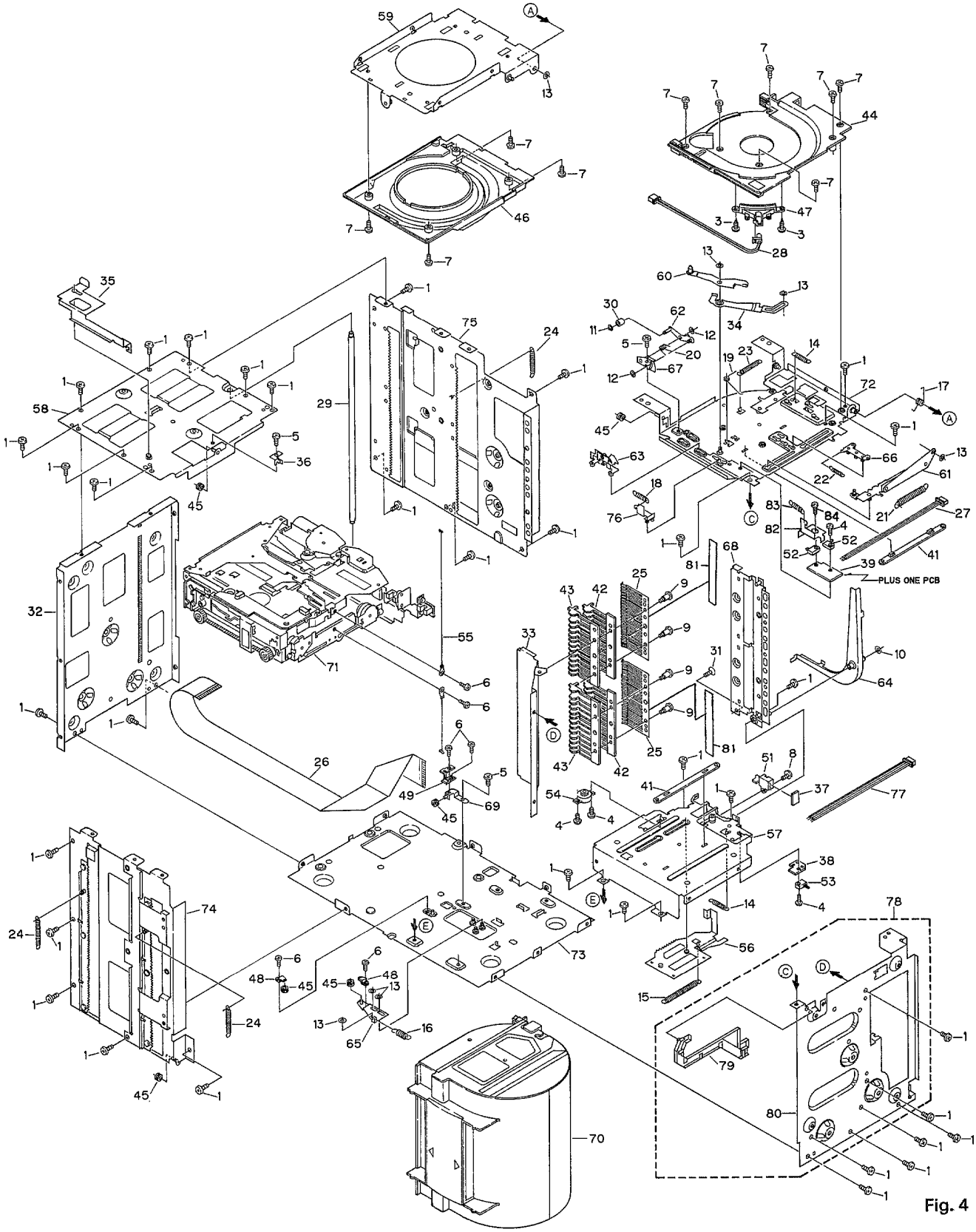


Fig. 4

● Parts List

Mark	No.	Description	Part No.
	1	Screw	BMZ30P040FMC
	2	·····	
	3	Screw	BPZ20P050FUC
	4	Screw	CBA1004
	5	Screw	CBA1037
	6	Screw	CBA1087
	7	Screw	CBA1154
	8	Screw	CBA1156
	9	Screw	CBA1396
	10	Washer	CBF1002
	11	Washer	CBF1037
	12	Washer	CBF1038
	13	Washer	CBF1039
	14	Spring	CBH1750
	15	Spring	CBH1751
	16	Spring	CBH1759
	17	Spring	CBH1760
	18	Spring	CBH1769
	19	Spring	CBH1807
	20	Spring	CBH1808
	21	Spring	CBH1809
	22	Spring	CBH1810
	23	Spring	CBH1815
	24	Spring	CBH1926
	25	Spring	CBL1218
	26	Connector	CDE4793
	27	Connector	CDE4876
	28	Lamp(IL903)	CEL1475
	29	Shaft	CLA2662
	30	Roller	CLA2783
	31	Screw	CMZ30P050FMC
	32	Frame	CNC5922
	33	Holder	CNC6149
	34	Arm	CNC6161
	35	Holder	CNC6390
	36	Bracket	CNC6763
	37	P.C.Board	CNP4062
	38	P.C.Board	CNP4067
	39	P.C.Board	CNP4068
	40	·····	
	41	Guide	CNV4228
	42	Arm	CNV4241
	43	Arm	CNV4242
	44	Case	CNV4251
	45	Roller	CNV4253
	46	Case	CNV4254
	47	Lighting Conductor	CNV4262
	48	Holder	CNV4375
	49	Holder	CNV4376
	50	·····	
	51	Switch(S1905)	CSN1034
	52	Switch(S1903,1904)	CSN1035
	53	Switch(S1906)	CSN1036
	54	Damper Unit	CXA6658
	55	Thread Unit	CXA9015
	56	Lever Unit	CXA9018
	57	Guide Unit	CXA9019
	58	Frame Unit	CXA9021
	59	Frame Unit	CXA9034
	60	Arm Unit	CXA9035
	61	Arm Unit	CXA9036
	62	Arm Unit	CXA9037
	63	Lever Unit	CXB1327
	64	Arm Unit	CXA9041
	65	Lever Unit	CXA9044
	66	Lever Unit	CXA9045
	67	Bracket Unit	CXA9046
	68	Bracket Unit	CXA9047
	69	Bracket Unit	CXA9049
	70	Case Unit	CXA9050
	71	Stage Mechanism Unit	CXA9060
	72	Frame Unit	CXB1223
	73	Frame Unit	CXB1221
	74	Frame Unit	CXB1222
	75	Frame Unit	CXB1224
	76	Lever Unit	CXA9397
	77	Connector	CDE4875
	78	Frame Unit	CXA9395
*	79	Holder	CNV4374
*	80	Frame	CNC5915
	81	Sheet	CNM5272
	82	Bracket	CNC7103
	83	Spring	CBH1981
	84	Screw	CBA1313

2.4 STAGE MECHANISM UNIT

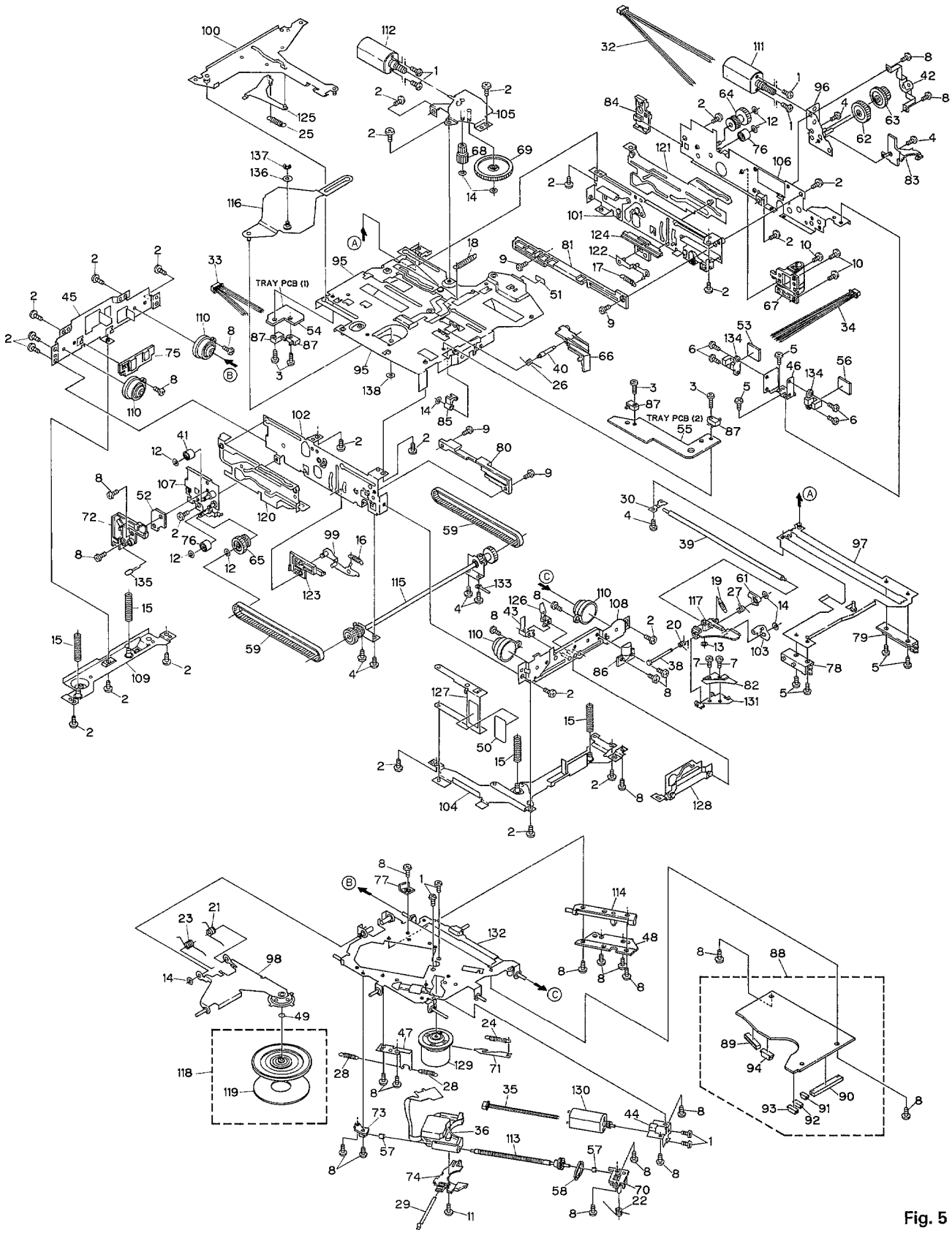


Fig. 5

● Parts List

Mark	No.	Description	Part No.
	1	Screw	BMZ20P022FMC
	2	Screw	BMZ26P030FMC
	3	Screw	CBA1004
	4	Screw	CBA1037
	5	Screw	CBA1041
	6	Screw	CBA1065
	7	Screw	CBA1087
	8	Screw	CBA1118
	9	Screw	CBA1154
	10	Screw	CBA1156
	11	Screw	CBA1362
	12	Washer	CBF1002
	13	Washer	CBF1037
	14	Washer	CBF1038
	15	Spring	CBH1754
	16	Spring	CBH1755
	17	Spring	CBH1756
	18	Spring	CBH1757
	19	Spring	CBH1758
	20	Spring	CBH1761
	21	Spring	CBH1762
	22	Spring	CBH1763
	23	Spring	CBH1765
	24	Spring	CBH1767
	25	Spring	CBH1806
	26	Spring	CBH1814
	27	Spring	CBH1927
	28	Spring	CBH1962
	29	Spring	CBL1219
	30	Spring	CBL1282
	31	·····	
	32	Connector	CDE4877
	33	Connector	CDE4878
	34	Connector	CDE5015
	35	Connector	CDE5018
	36	Pickup Unit(Service)	CXX1230
	37	·····	
	38	Shaft	CLA2687
	39	Shaft	CLA2702
	40	Shaft	CLA2779
	41	Shaft	CLA3069
	42	Guide	CNC5919
	43	Arm	CNC5946
	44	Bracket	CNC5950
	45	Frame	CNC6152
	46	Bracket	CNC6345
	47	Bracket	CNC6964
	48	Bracket	CNC7003
	49	Spacer	CNM1787
	50	Sheet	CNM4679
	51	Sheet	CNM4820
	52	P.C.Board	CNP4063
	53	P.C.Board	CNP4064
	54	P.C.Board	CNP4065
	55	P.C.Board	CNP4066
	56	P.C.Board	CNP4517
	57	Bearing	CNR1415
	58	Belt	CNT1066
	59	Belt	CNT1076
	60	·····	
	61	Arm	CNV4223
	62	Worm Wheel	CNV4227
	63	Gear	CNV4229
	64	Gear	CNV4232
	65	Gear	CNV4236
	66	Arm	CNV4237
	67	Holder	CNV4239
	68	Worm Wheel	CNV4245
	69	Gear	CNV4248
	70	Holder	CNV4256
	71	Holder	CNV4257
	72	Holder	CNV4258
	73	Holder	CNV4259
	74	Rack	CNV4261
	75	Holder	CNV4263
	76	Pulley	CNV4270
	77	Holder	CNV4271
	78	Guide	CNV4365
	79	Guide	CNV4366
	80	Guide	CNV4367
	81	Guide	CNV4368
*	82	Arm	CNV4370
	83	Holder	CNV4373
	84	Arm	CNV4377
	85	Arm	CNV4789
	86	Guide	CNV4855
	87	Switch(S401-404)	CSN1036
	88	CD Core Unit	CWX1931
	89	Connector(CN101)	CKS1953
	90	Connector(CN701)	CKS1968
	91	Connector(CN301)	CKS3124
	92	Connector(CN402)	CKS3126
	93	Connector(CN403)	CKS3127
	94	Connector(CN401)	CKS3128
	95	Chassis Unit	CXB1299

Mark No.	Description	Part No.
96	Bracket Unit	CXA9023
97	Lever Unit	CXA9024
98	Arm Unit	CXA9025
99	Arm Unit	CXA9026
100	Lever Unit	CXA9027
101	Frame Unit	CXA9028
102	Frame Unit	CXA9029
103	Arm Unit	CXA9031
104	Bracket Unit	CXA9032
105	Bracket Unit	CXA9033
106	Frame Unit	CXA9039
107	Bracket Unit	CXA9040
108	Frame Unit	CXB1328
109	Bracket Unit	CXA9043
110	Damper Unit	CXA9052
111	Motor Unit(M3,ELV)	CXA9055
112	Motor Unit(M4,Load)	CXA9056
113	Screw Unit	CXA9058
114	Holder Unit	CXA9059
115	Gear Unit	CXA9062
116	Arm Unit	CXA9063
117	Arm Unit	CXA9064
118	Clamper Unit	CXA9197
119	Sheet	CNM5286
120	Lever Unit	CXA9198
121	Lever Unit	CXA9199
122	Arm Unit	CXA9200
123	Guide Unit	CXA9201
124	Guide Unit	CXA9202
125	Arm Unit	CXA9203
126	Arm Unit	CXA9205
127	Arm Unit	CXA9206
128	Lever Unit	CXA9207
129	Motor Unit(M1,Spindle)	CXB1317
130	Motor Unit(M2,Carriage)	CXA9565

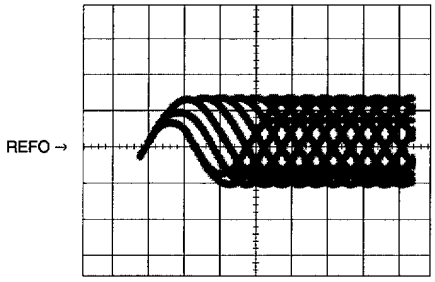
Mark No.	Description	Part No.
131	Arm Unit	CXA9731
132	Chassis Unit	CXB1220
133	Clamper	HEF-102
134	Photo-interrupter(D401,402)	ON1113PA
135	Diode(D403)	PR3432S
136	Washer	WC25FMC
137	Washer	YE20FUC
138	Washer	CBF1039

3. SCHEMATIC DIAGRAMS

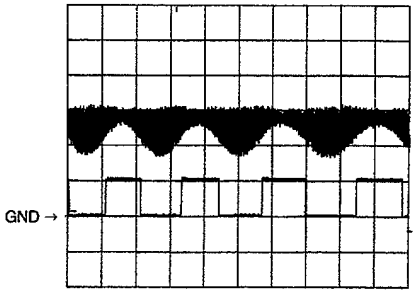
Note:1. The encircled numbers denote measuring pointes in the circuit diagram.
2. Reference voltage
REFO:2.5V

● Waveforms

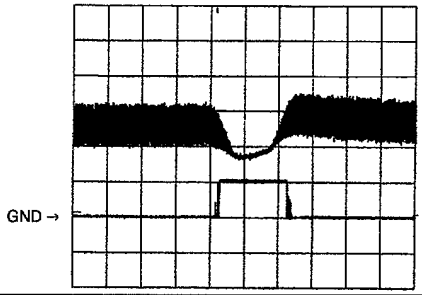
① RFO 0.5V/div. 0.5µs/div.
Normal mode: play



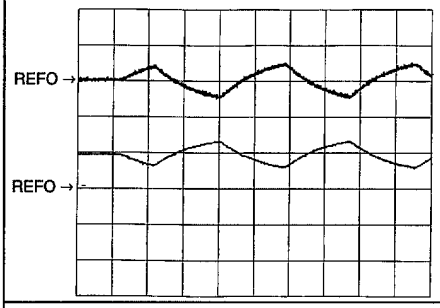
① CH1: RFO 1V/div. 0.5ms/div.
② CH2: MIRR 5V/div.
Test mode: Tracking open



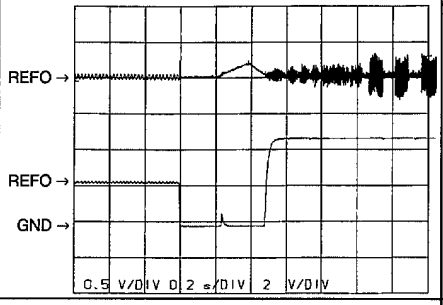
① CH1: RFO 1V/div. 0.5ms/div.
② CH2: MIRR 5V/div.
Normal mode: The defect part passes 800µm



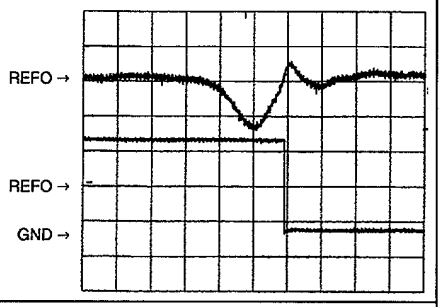
③ CH1: FD 0.5V/div. 0.2s/div.
④ CH2: FOP 2V/div.
Test mode: No disc, Focus close



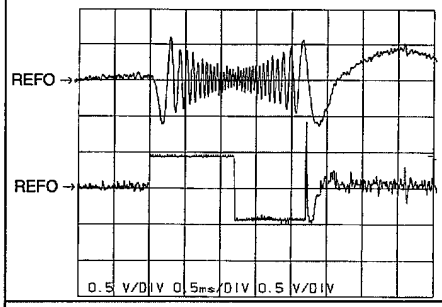
③ CH1: FD 0.5V/div. 0.2s/div.
⑤ CH2: FOK 2V/div.
Normal mode: Focus close



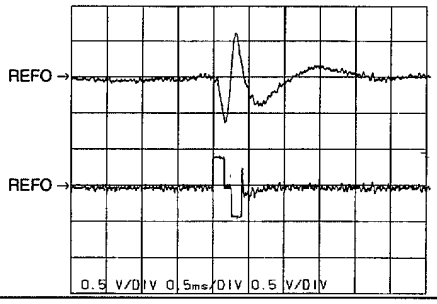
⑥ CH1: FEY 0.5V/div. 1ms/div.
⑦ CH2: XSI 2V/div.
Normal mode: Focus close



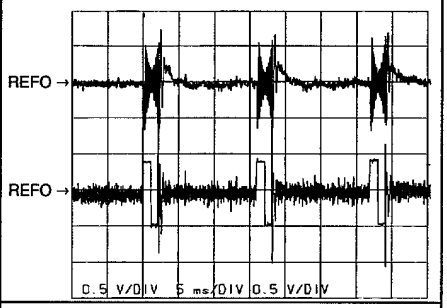
⑧ CH1: TEY 0.5V/div. 0.5ms/div.
⑨ CH2: TD 0.5V/div.
Test mode: 32 tracks jump (FWD)



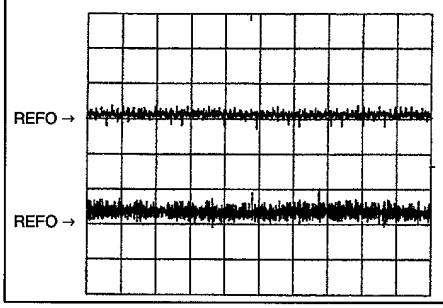
⑧ CH1: TEY 0.5V/div. 0.5ms/div.
⑨ CH2: TD 0.5V/div.
Test mode: Single jump (FWD)



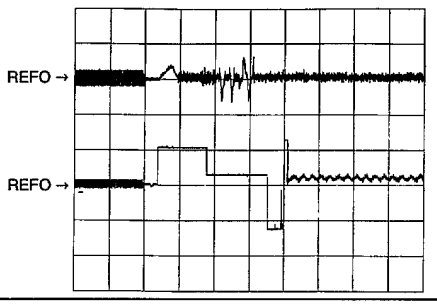
⑧ CH1: TEY 0.5V/div. 5ms/div.
⑨ CH2: TD 0.5V/div.
Test mode: 100 tracks jump (FWD)



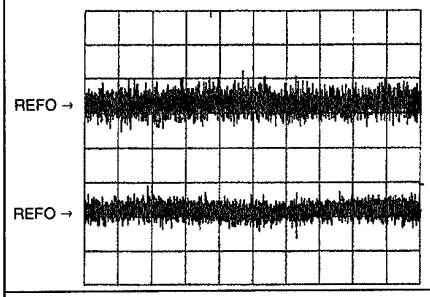
⑥ CH1: FEY 0.1V/div. 20ms/div.
③ CH2: FD 0.2V/div.
Normal mode: Play



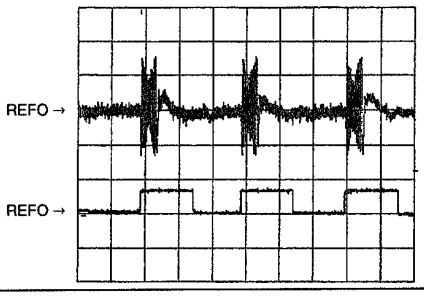
③ CH1: FD 0.5V/div. 0.5s/div.
⑩ CH2: MDY 1V/div.
Normal mode: Focus close



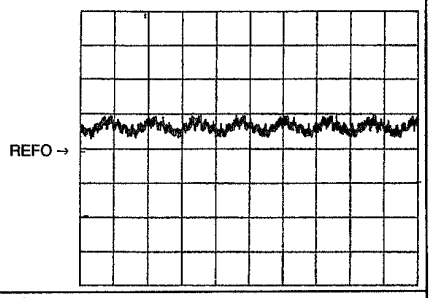
⑧ CH1: TEY 0.2V/div. 20ms/div.
⑨ CH2: TD 0.2V/div.
Normal mode: play



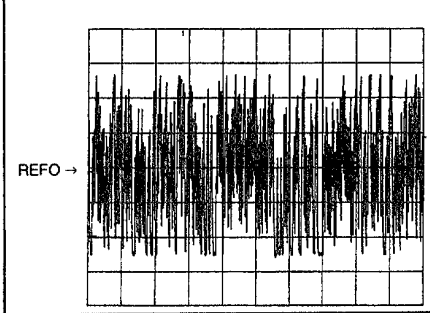
⑧ CH1: TEY 0.5V/div. 5ms/div.
⑪ CH2: SD 0.5V/div.



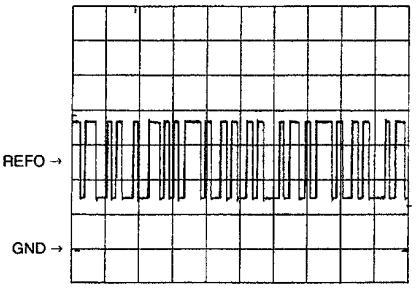
⑩ MDY 0.5V/div. 0.1s/div.
Normal mode: Play



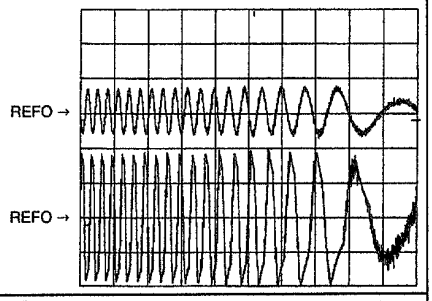
⑩ MDY 0.5V/div. 10ms/div.
Long Search



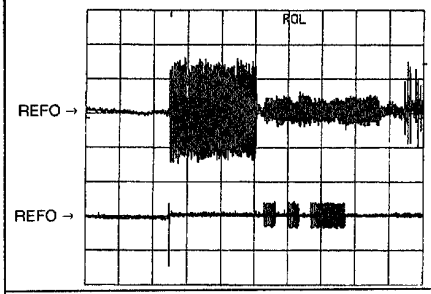
⑫ EFM 1V/div. 5µs/div.
Play



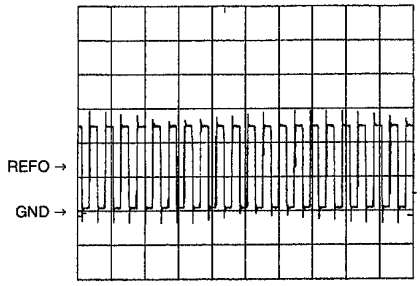
⑧ CH1: TEY 1V/div. 2ms/div.
⑬ CH2: TEC 1V/div.
Test mode: Focus close
Tracking open



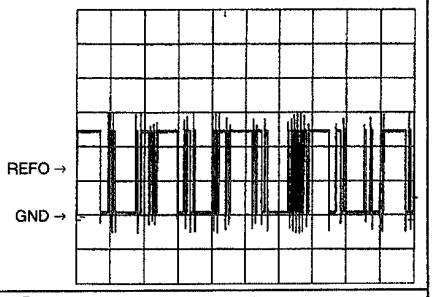
⑧ CH1: TEY 0.5V/div. 0.2s/div.
⑥ CH2: FEY 0.5V/div.
Normal mode: AGC after focus close



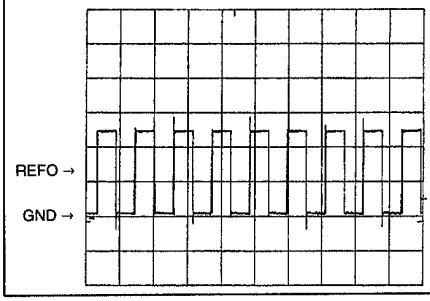
⑭ SCKO 2V/div. 1µs/div.
Play



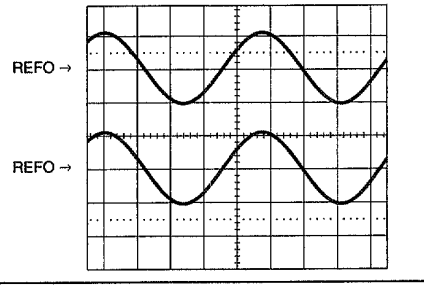
⑮ Dout 2V/div. 10µs/div.
Play



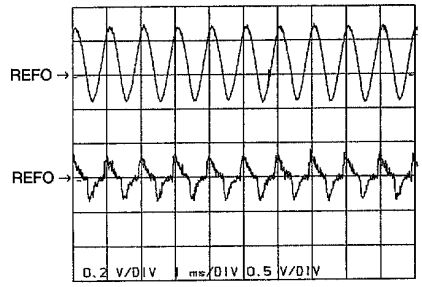
⑯ LRCK 2V/div. 20µs/div.

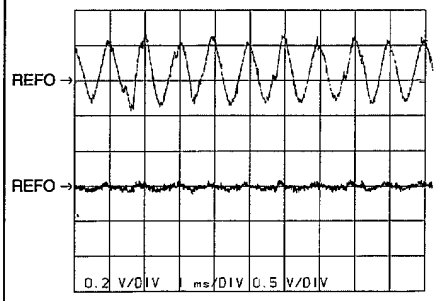
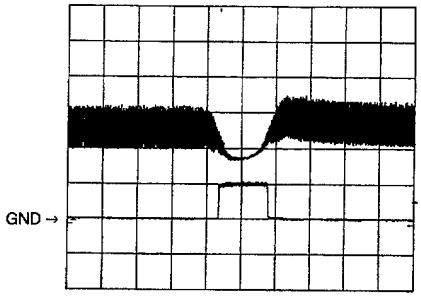
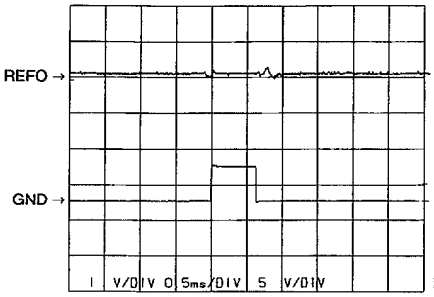


⑱ CH1: R OUT 1V/div. 0.2ms/div.
⑰ CH2: L OUT 1V/div.
Normal mode: Play (1kHz 0dB)

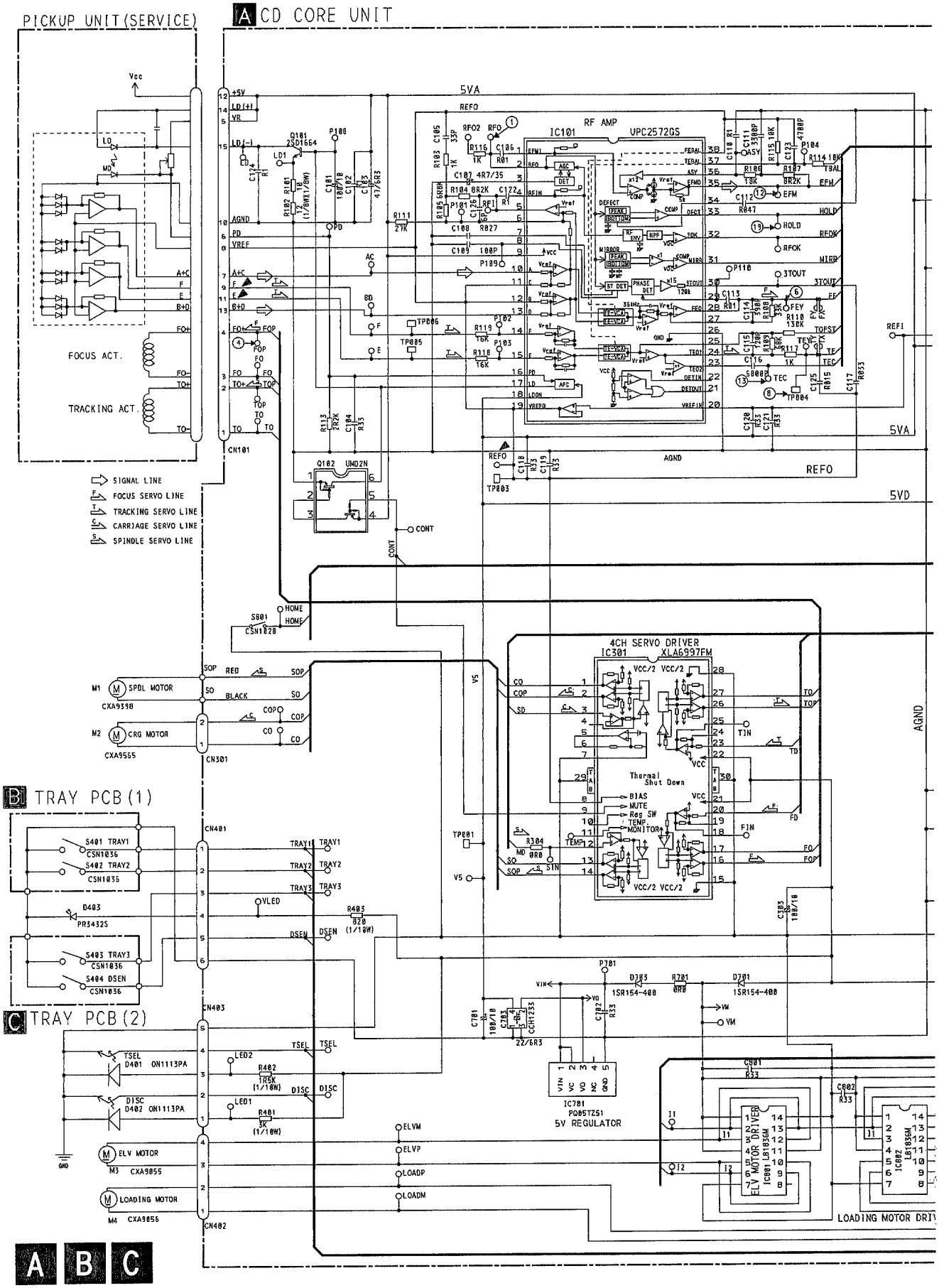


⑥ CH1: FEY 0.2V/div. 1ms/div.
③ CH2: FD 0.5V/div.
Normal mode: During AGC



⑧ CH1: TEY 0.2V/div. ⑨ CH2: TD 0.5V/div. 1ms/div. Normal mode: During AGC  	① CH1: RFO 1V/div. ⑲ CH2: HOLD 5V/div. 0.5ms/div. Normal mode: The defect part passes 800µm  	③ CH1: FD 1V/div. ⑲ CH2: HOLD 5V/div. 0.5ms/div. Normal mode: The defect part passes 800µm 

3.1 OVERRAL CONNECTION DIAGRAM(1)



A B C

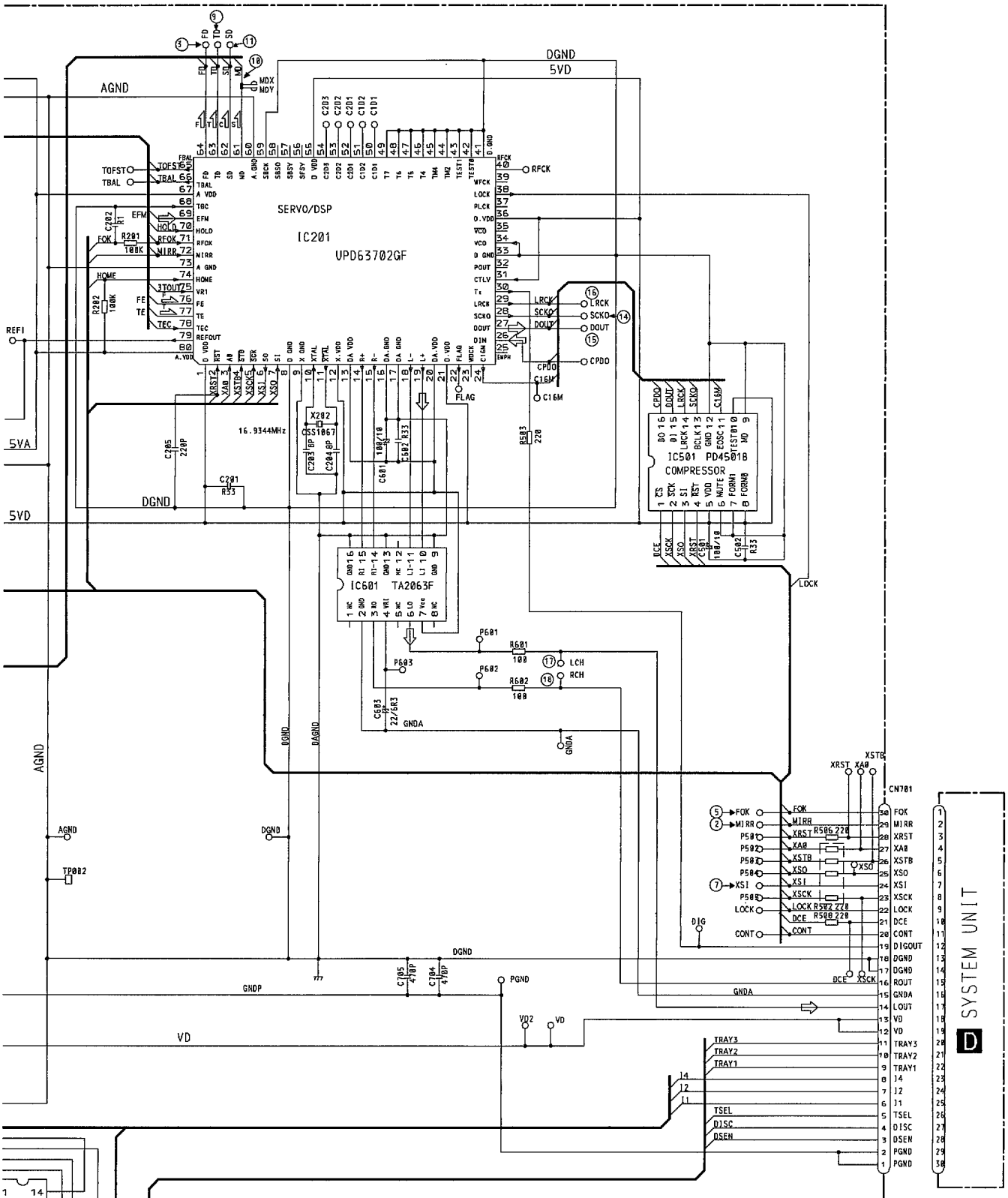
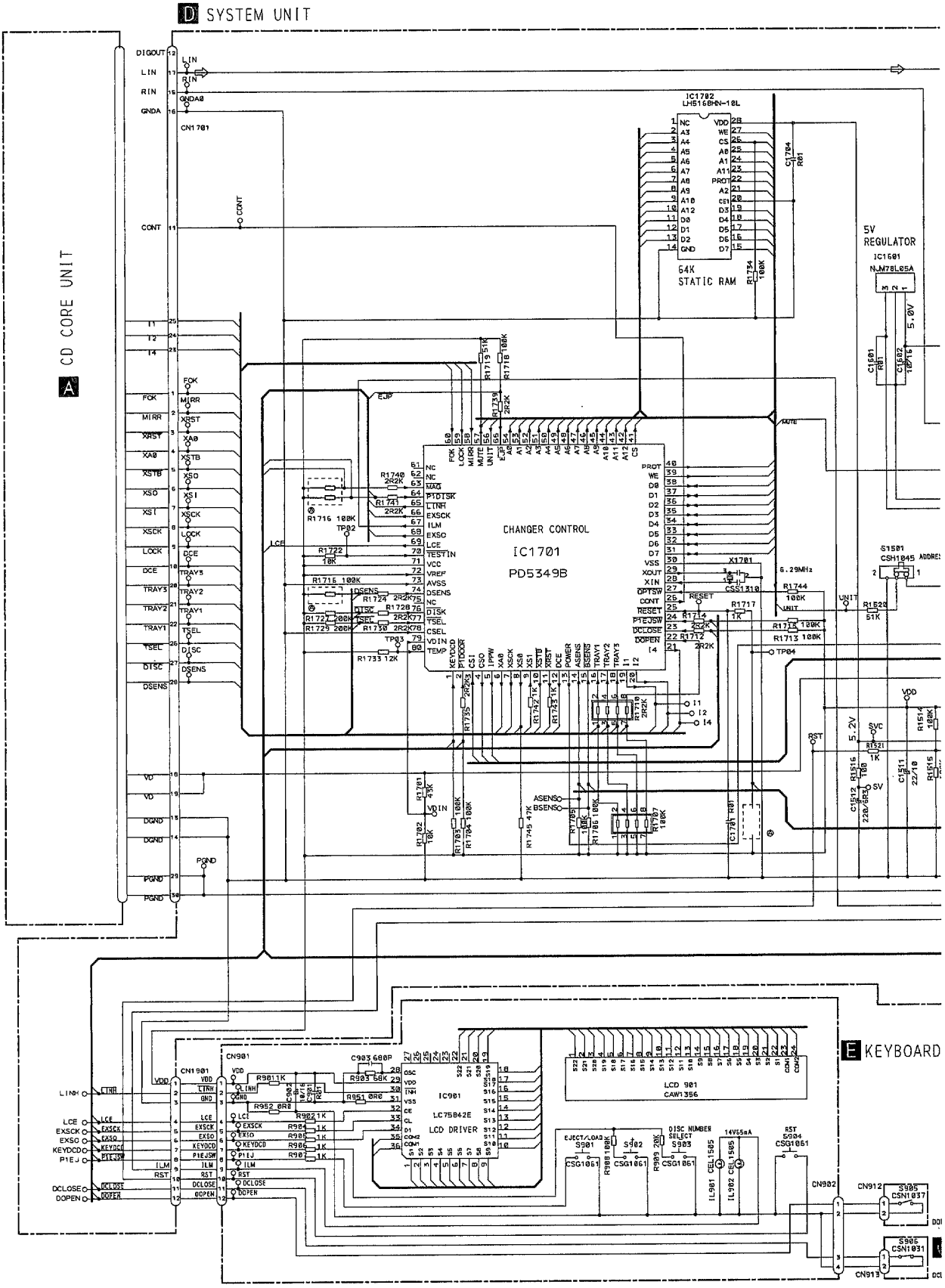
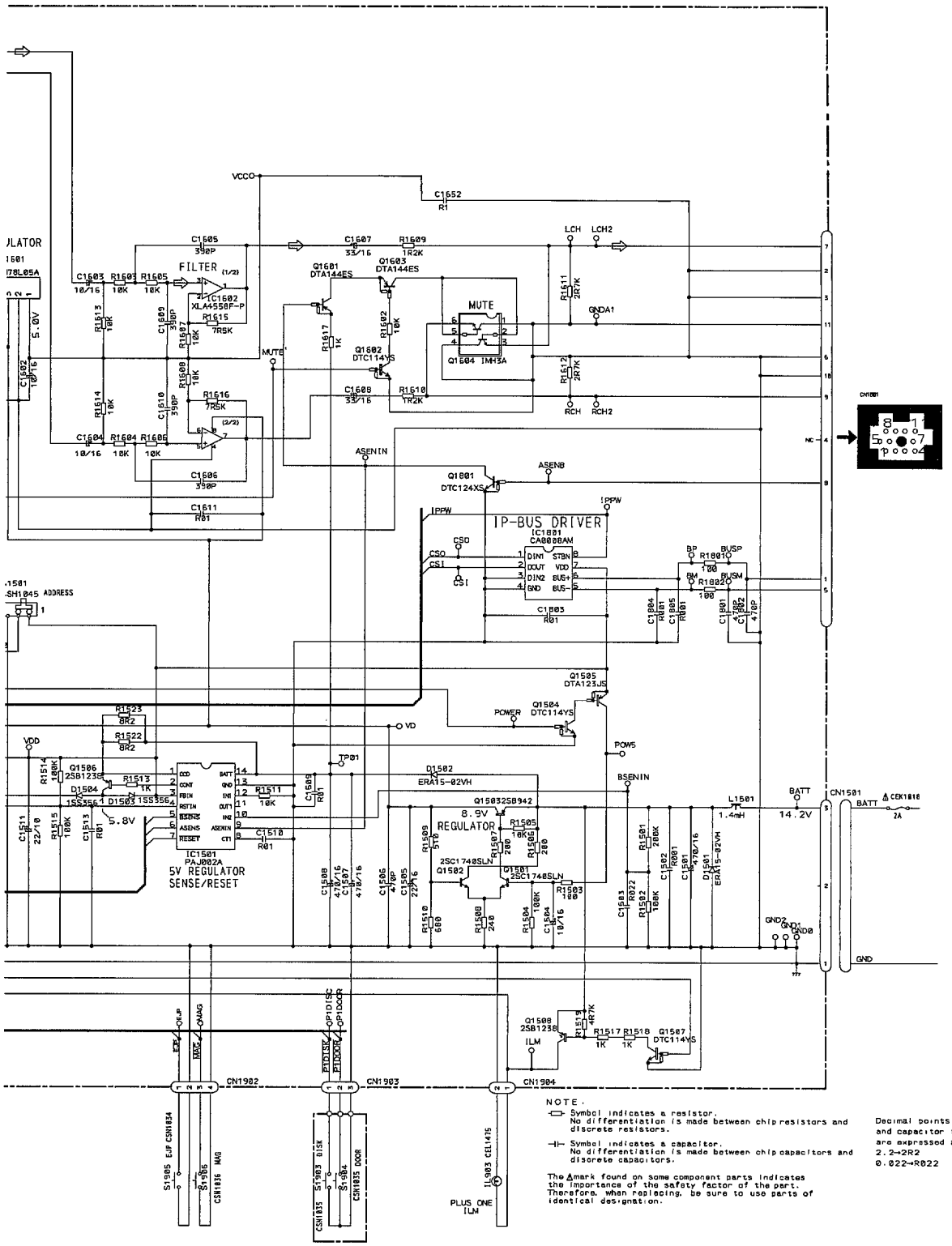

SERVO/DSP
IC201
UPD63702GF
IC501 PD4501B
COMPRESSOR
IC601 TA2063F
16.9344MHz
AGND
DGND
5VD
5VA
VD
PGND
GNDP
GNDA
SYSTEM UNIT
D
SWITCHES
CD CORE UNIT
S801 HOME SWITCH ON-OFF
TRAY PCB (1)
S401 TRAY1 SWITCH ON-OFF
S402 TRAY2 SWITCH ON-OFF
TRAY PCB (2)
S403 TRAY3 SWITCH ON-OFF
S404 DSEN SWITCH ON-OFF
The underlined indicates the switch position.

Fig. 6

3.2 OVERRAL CONNECTION DIAGRAM(2)





NOTE.

⇨ Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.

⊣⊢ Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

The △mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

Decimal points for resistor and capacitor fixed values are expressed as
2.2→2R2
0.022→R022

F SWITCH PCB (A)

S905 CSN1037 DOPEN

S906 CSN1031 G SWITCH PCB (B) DCLOSE

R1716 100K

H PLUS ONE PCB

SWITCHES·
SYSTEM UNIT
S1501 ADDRESS SWITCH····· 1-2
SWITCH PCB (A)
S905 : DOPEN SWITCH····· ON-OFF
SWITCH PCB (B)
S906 : DCLOSE SWITCH ····· ON-OFF
The underlined indicates the switch position.

Fig. 7

D F G H

4. PCB CONNECTION DIAGRAMS

4.1 CD CORE UNIT

A

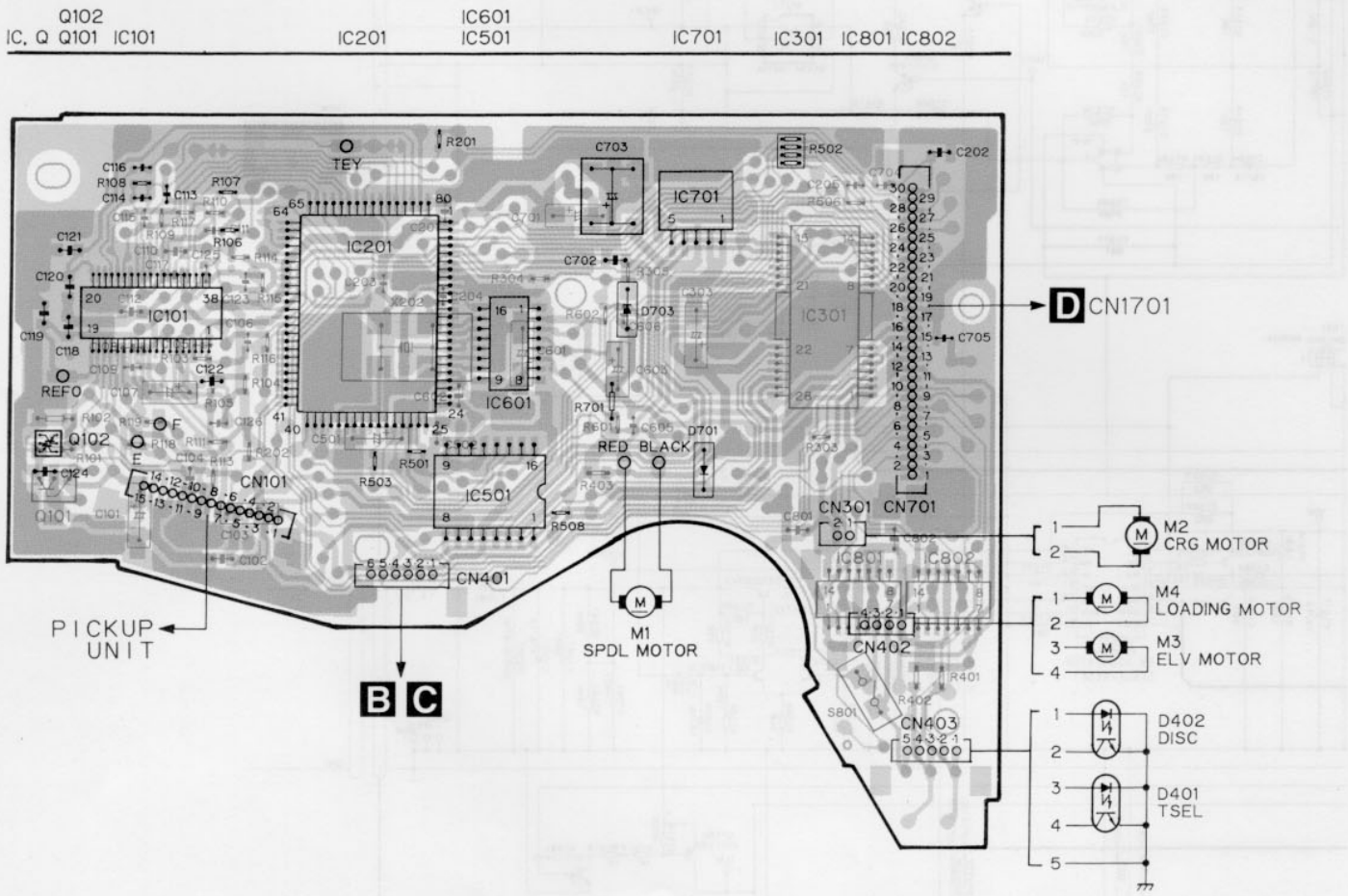


Fig. 8

NOTE:

The parts mounted on this PCB include all necessary parts for several destinations.
For further information for respective destinations, be sure to check with the schematic diagram.

4.2 SYSTEM UNIT

D

IC, Q

Q1501 Q1502 Q1801

Q1504 Q1505 Q1601

Q1503

Q1507

Q1604

Q1508 Q1603 Q1602

Q1651

Q1506 IC1602 IC1651

IC1501

IC1601

IC1801

IC1701

IC1702

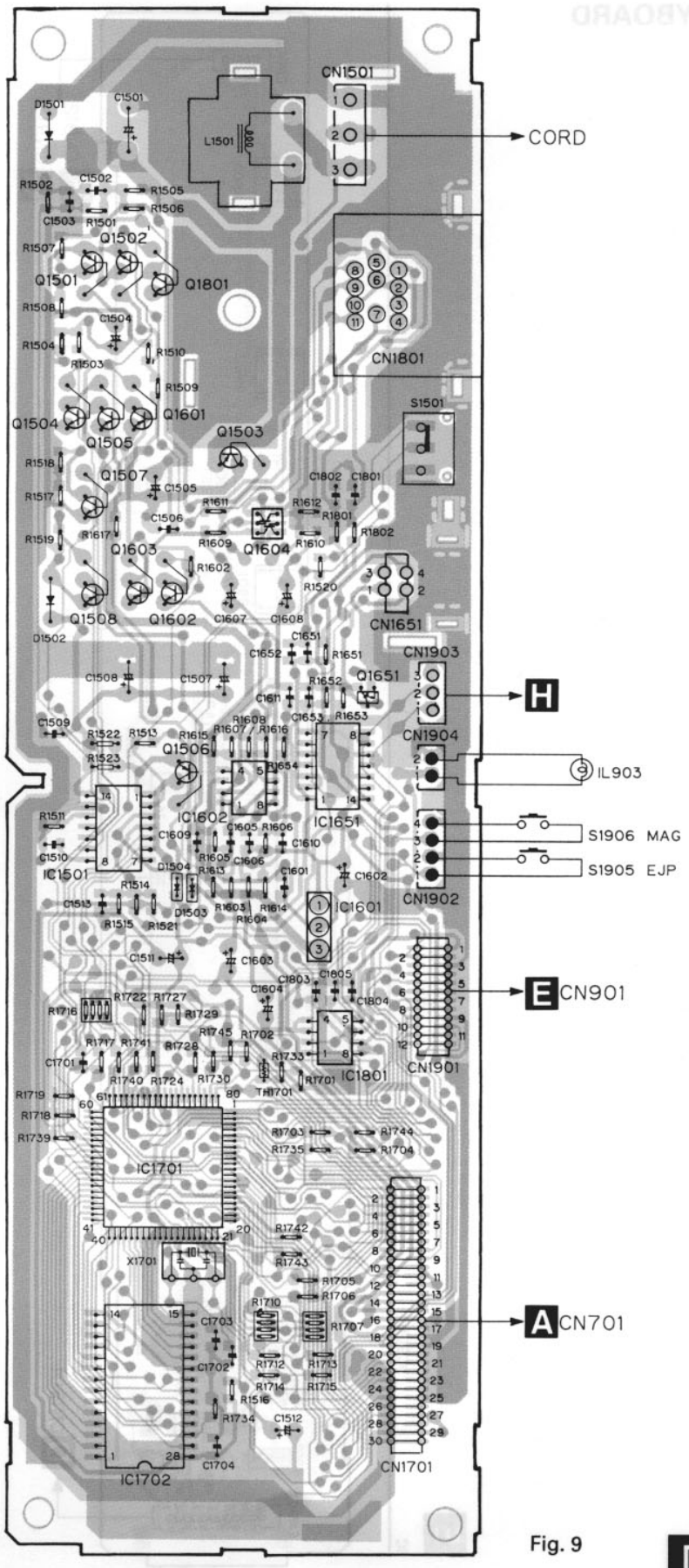


Fig. 9

4.3 KEYBOARD

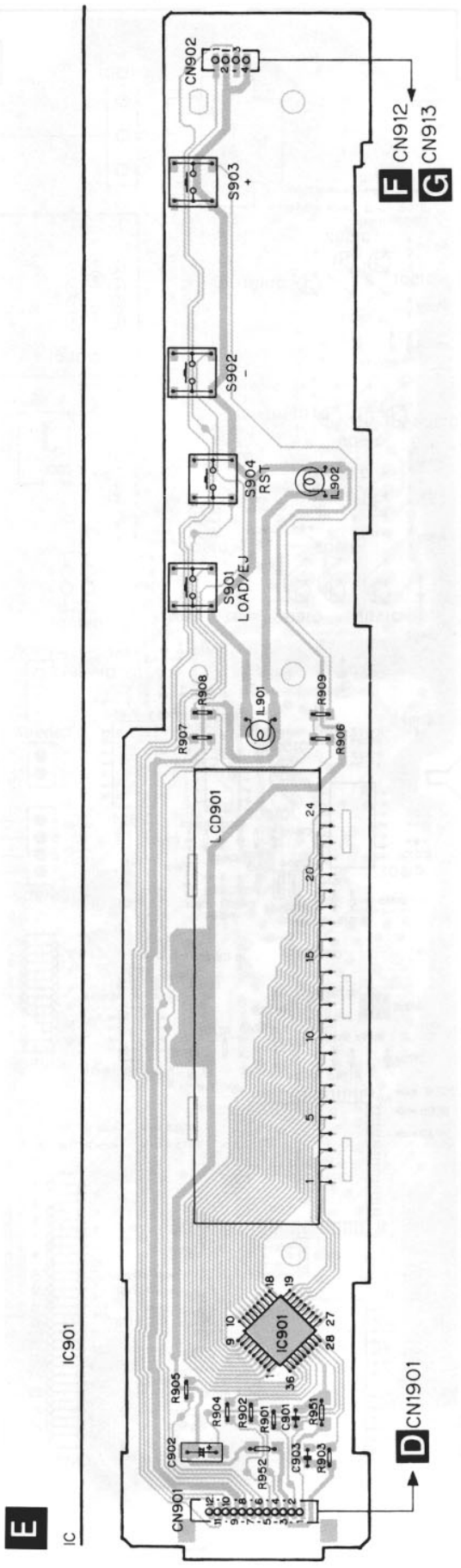
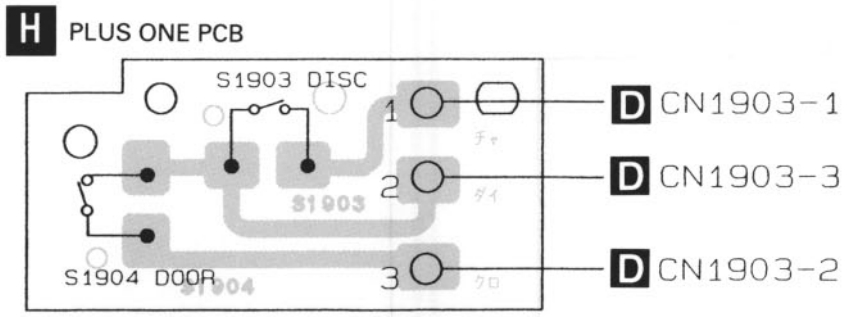
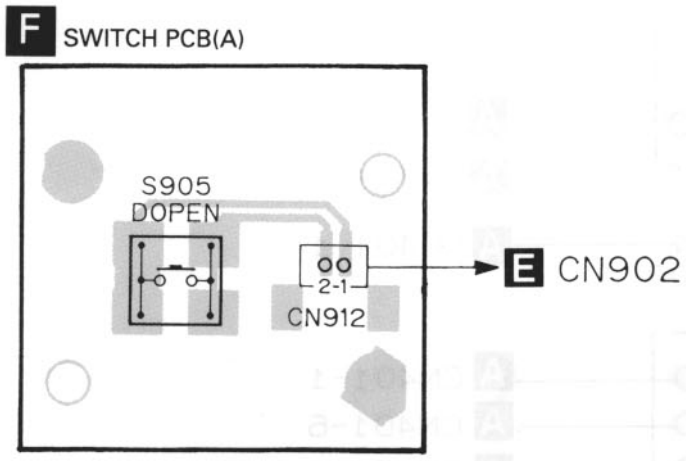


Fig.10

4.4 PLUS ONE PCB,SWITCH PCB(A),SWITCH PCB(B)





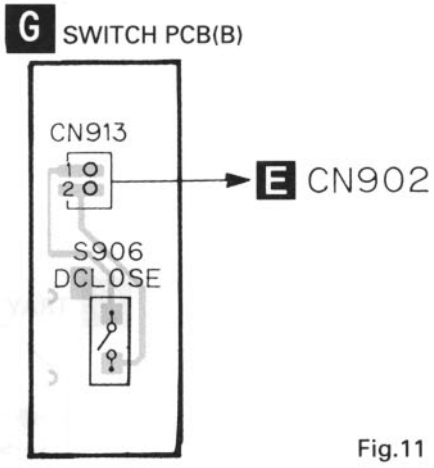


Fig.11

4.5 TRAY PCB(1),TRAY PCB(2)

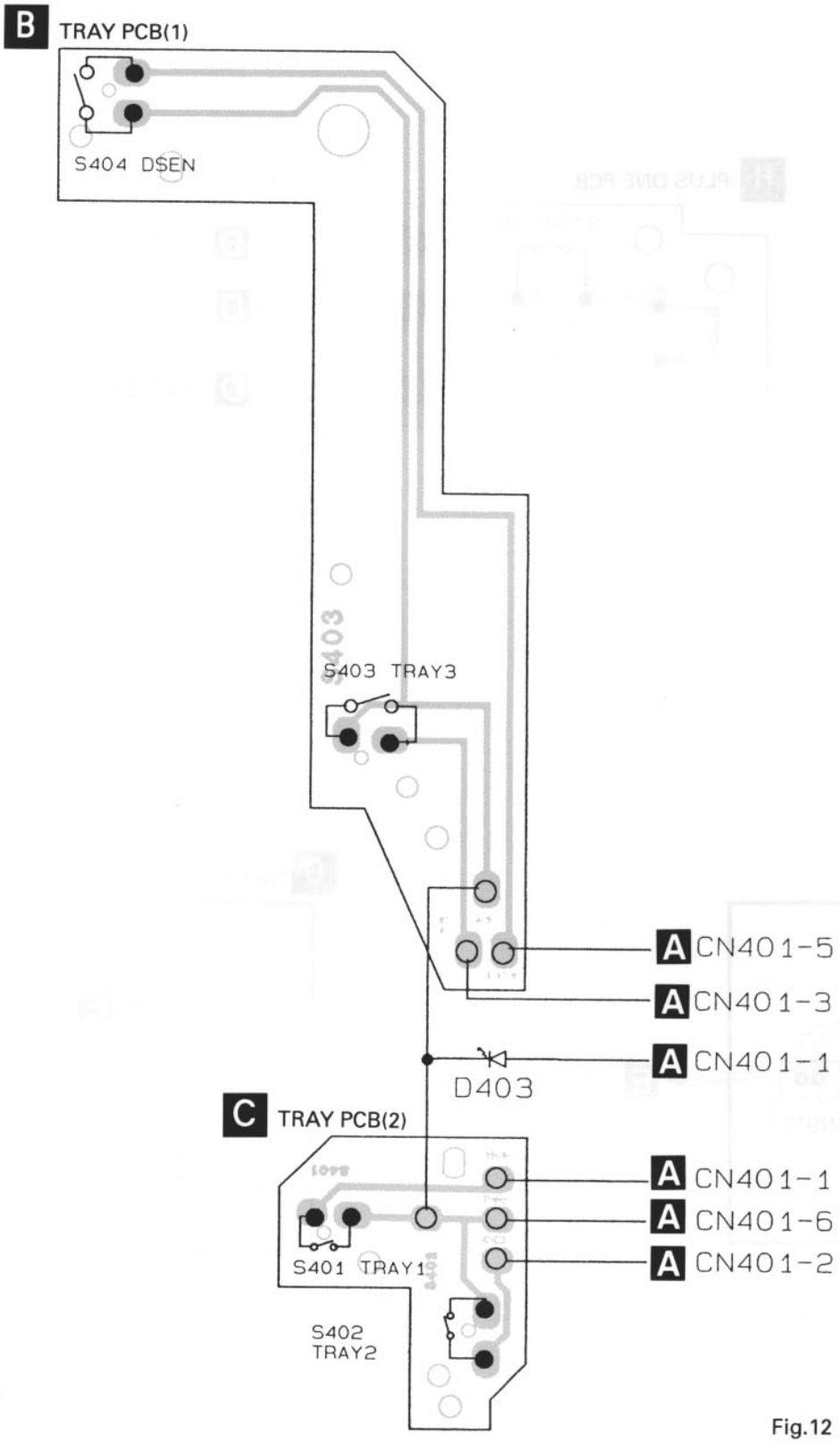


Fig.12

5. ELECTRICAL PARTS LIST

NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/○S○○○J,RS1/○○S○○○J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

A Unit Number : CWX1931
Unit Name : CD Core Unit

=====Circuit Symbol & No.	Part Name=====	Part No.
MISCELLANEOUS		
IC 101	IC	UPC2572GS
IC 201	IC	UPD63702GF
IC 301	IC	XLA6997FM
IC 501	IC	PD4501B
IC 601	IC	TA2063F
IC 701	IC	PQ05TZ51
IC 801	IC	LB1836M
IC 802	IC	LB1836M
Q 101	Transistor	2SD1664
Q 102	Transistor	UMD2N
D 701		1SR154-400
D 703		1SR154-400
X 202	Crystal Resonator	CSS1067
S 801	Switch(HOME)	CSN1028
RESISTORS		
R 101		RS1/8S100J
R 102		RS1/8S120J
R 103		RS1/16S102J
R 104		RS1/16S822J
R 105		RS1/16S682J
R 106		RS1/16S183J
R 107		RS1/16S822J
R 108		RS1/16S333J
R 109		RS1/16S683J
R 110		RS1/16S134J
R 111		RS1/16S273J
R 113		RS1/16S222J
R 114		RS1/16S103J
R 115		RS1/16S103J
R 116		RS1/16S102J
R 117		RS1/16S102J
R 118		RS1/16S163J
R 119		RS1/16S163J
R 201		RS1/16S104J
R 202		RS1/16S104J
R 304		RS1/16S0R0J
R 401		RS1/10S302J
R 402		RS1/10S152J
R 403		RS1/10S821J
R 502		RA4C221J
R 503		RS1/16S221J
R 506		RS1/16S221J
R 508		RS1/16S221J
R 601		RS1/16S101J
R 602		RS1/16S101J
R 701		RS1/8S0R0J

=====Circuit Symbol & No.	Part Name=====	Part No.
CAPACITORS		
C 101		CEV101M10
C 102		CKSQYB104K16
C 103		CEV470M6R3
C 104		CKSQYB334K16
C 105		CCSRCH330J50
C 106		CKSRYB103K25
C 107		CEV4R7M35
C 108		CKSQYB273K50
C 109		CCSRCH101J50
C 110		CKSQYB104K16
C 111		CKSRYB332K50
C 112		CKSQYB473K16
C 113		CKSRYB103K25
C 114		CCSRCH391J50
C 115		CCSRCH121J50
C 116		CKSRYB682K25
C 117		CKSQYB333K25
C 118		CKSQYB334K16
C 119		CKSQYB334K16
C 120		CKSQYB334K16
C 121		CKSQYB334K16
C 122		CKSQYB104K16
C 123		CKSRYB472K50
C 124		CKSQYB104K16
C 125		CKSRYB153K25
C 126		CCSRCH060D50
C 201		CKSQYB334K16
C 202		CKSQYB104K16
C 203		CCSRCH080D50
C 204		CCSRCH080D50
C 205		CKSRYB221K50
C 303		CEV101M10
C 501		CEV101M10
C 502		CKSQYB334K16
C 601		CEV101M10
C 602		CKSQYB334K16
C 603		CEV220M6R3
C 701		CEV101M10
C 702		CKSQYB334K16
C 703	22 μF/6.3V	CCH1233
C 704		CKSRYB471K50
C 705		CKSRYB471K50
C 801		CKSQYB334K16
C 802		CKSQYB334K16

=====Circuit Symbol & No. Part	Name=====	Part No.
E Unit Number :		
Unit Name :	Key Board	
MISCELLANEOUS		
IC 901	IC	LC75842E
S 901		CSG1061
S 902		CSG1061
S 903		CSG1061
S 904		CSG1061
IL 901	Lamp 14V65mA	CEL1505
IL 902	Lamp 14V65mA	CEL1505
LCD 901	LCD	CAW1356
RESISTORS		
R 901		RS1/10S102J
R 902		RS1/10S102J
R 903		RS1/10S683J
R 904		RS1/10S102J
R 905		RS1/10S102J
R 906		RS1/10S102J
R 907		RS1/10S102J
R 908		RS1/10S104J
R 909		RS1/10S203J
R 951		RS1/8S0R0J
R 952		RS1/8S0R0J
CAPACITORS		
C 901		CKSQYB103K50
C 902		CEV100M16
C 903		CCSQCH681J50
D Unit Number :	CWX1952	
Unit Name :	System Unit	
MISCELLANEOUS		
IC 1501	IC	PAJ002A
IC 1601	IC	NJM78L05A
IC 1602	IC	XLA4558F-P
IC 1701	IC	PD5349B
IC 1702	IC	LH5168HN-10L
IC 1801	IC	CA0008AM
Q 1501	Transistor	2SC1740SLN
Q 1502	Transistor	2SC1740SLN
Q 1503	Transistor	2SB942
Q 1504	Transistor	DTC114YS
Q 1505	Transistor	DTA123JS
Q 1506	Transistor	2SB1238
Q 1507	Transistor	DTC114YS
Q 1508	Transistor	2SB1238
Q 1601	Transistor	DTA144ES
Q 1602	Transistor	DTC114YS
Q 1603	Transistor	DTA144ES
Q 1604	Transistor	IMH3A
Q 1801	Transistor	DTC124XS
D 1501	Diode	ERA15-02VH
D 1502	Diode	ERA15-02VH
D 1503	Diode	1SS356
D 1504	Diode	1SS356
L 1501	Choke Coil 1.4mH	CTH1129
X 1701	Ceramic Resonator 6.29MHz	CSS1310
S 1501	Switch(ADDRESS)	CSH1045

=====Circuit Symbol & No. Part	Name=====	Part No.
RESISTORS		
R 1501		RS1/10S204J
R 1502		RS1/10S104J
R 1503		RS1/10S101J
R 1504		RS1/10S104J
R 1505		RS1/10S103J
R 1506		RS1/10S201J
R 1507		RS1/10S201J
R 1508		RS1/10S241J
R 1509		RS1/10S511J
R 1510		RS1/10S681J
R 1511		RS1/10S103J
R 1513		RS1/10S102J
R 1514		RS1/10S104J
R 1515		RS1/10S104J
R 1516		RS1/10S101J
R 1517		RS1/10S102J
R 1518		RS1/10S102J
R 1519		RS1/10S472J
R 1520		RS1/10S513J
R 1521		RS1/10S102J
R 1522		RS1/8S8R2J
R 1523		RS1/8S8R2J
R 1602		RS1/10S103J
R 1603		RS1/10S103J
R 1604		RS1/10S103J
R 1605		RS1/10S103J
R 1606		RS1/10S103J
R 1607		RS1/10S103J
R 1608		RS1/10S103J
R 1609		RS1/10S122J
R 1610		RS1/10S122J
R 1611		RS1/10S272J
R 1612		RS1/10S272J
R 1613		RS1/10S103J
R 1614		RS1/10S103J
R 1615		RS1/10S752J
R 1616		RS1/10S752J
R 1617		RS1/10S102J
R 1701		RS1/10S433J
R 1702		RS1/10S103J
R 1703		RS1/10S104J
R 1704		RS1/10S104J
R 1705		RS1/10S104J
R 1706		RS1/10S104J
R 1707		RA4C104J
R 1710		RA4C222J
R 1712		RS1/10S222J
R 1713		RS1/10S104J
R 1714		RS1/10S222J
R 1715		RS1/10S104J
R 1716		RA4C104J
R 1717		RS1/10S102J
R 1718		RS1/10S104J
R 1719		RS1/10S513J
R 1722		RS1/10S103J
R 1724		RS1/10S222J
R 1727		RS1/10S204J
R 1728		RS1/10S222J
R 1729		RS1/10S204J
R 1730		RS1/10S222J
R 1733		RS1/10S123J
R 1734		RS1/10S104J
R 1735		RS1/10S222J
R 1739		RS1/10S222J
R 1740		RS1/10S222J

=====Circuit Symbol & No. Part Name=====			Part No.
R	1741		RS1/10S222J
R	1742		RS1/10S102J
R	1743		RS1/10S102J
R	1744		RS1/10S104J
R	1745		RS1/10S473J
R	1801		RS1/10S101J
R	1802		RS1/10S101J
CAPACITORS			
C	1501		CEAS471M16
C	1502		CKSQYB102K50
C	1503		CKSQYB223K50
C	1504		CEA100M16LL
C	1505		CEA220M16LL
C	1506		CKSQYB471K50
C	1507		CEAS471M16
C	1508		CEAS471M16
C	1509		CKSQYB103K50
C	1510		CKSQYB103K50
C	1511		CSZA220M10
C	1512		CEA221M6R3LL
C	1513		CKSQYB103K50
C	1601		CKSQYB103K50
C	1602		CEA100M16LL
C	1603		CEA100M16LL
C	1604		CEA100M16LL
C	1605		CKSQYB391K50
C	1606		CKSQYB391K50
C	1607		CEA330M16LL
C	1608		CEA330M16LL
C	1609		CKSQYB391K50
C	1610		CKSQYB391K50
C	1611		CKSQYB103K50
C	1652		CKSQYB104K16
C	1701		CKSQYB103K50
C	1704		CKSQYB103K50
C	1801		CKSQYB471K50
C	1802		CKSQYB471K50
C	1803		CKSQYB103K50
C	1804		CKSQYB102K50
C	1805		CKSQYB102K50
F	Unit Number :		
	Unit Name :	Switch PCB(A)	
S	905	Switch(DOPEN)	CSN1037
G	Unit Number :		
	Unit Name :	Switch PCB(B)	
S	906	Switch(DCLOSE)	CSN1031
B	Unit Number :		
	Unit Name :	Tray PCB(1)	
S	401	Switch(TRAY1)	CSN1036
S	402	Switch(TRAY2)	CSN1036
C	Unit Number :		
	Unit Name :	Tray PCB(2)	
S	403	Switch(TRAY3)	CSN1036
S	404	Switch(DSEN)	CSN1036

=====Circuit Symbol & No. Part Name=====			Part No.
H	Unit Number :		
	Unit Name :	Plus One PCB	
S	1903	Switch(DISK)	CSN1035
S	1904	Switch(DOOR)	CSN1035
Miscellaneous Parts List			
D	401	Photo-interrupter	ON1113PA
D	402	Photo-interrupter	ON1113PA
D	403		PR3432S
		Pickup Unit(Service)	CXX1230
M	1	Motor Unit(Spindle)	CXA9398
M	2	Motor Unit(Carriage)	CXA9565
M	3	Motor Unit(ELV)	CXA9055
M	4	Motor Unit(Loading)	CXA9056
IL	903	Lamp	CEL1475
S	1905	Switch(EJP)	CSN1034
S	1906	Switch(MAG)	CSN1036

6. ADJUSTMENT

6.1 CD ADJUSTMENT

1)Precautions

- This unit uses a single power supply (+5V) for the regulator. The signal reference potential, therefore, is connected to REFO(approx. 2.5V) instead of GND.
  If REFO and GND are connected to each other by mistake during adjustments,not only will it be impossible to measure the potential correctly,but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this,take special note of the following.
- Do not connect the negative probe of the measuring equipment to REFO and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to REFO with the channel 2 negative probe connected to GND.
  Since the frame of the measuring instrument is usually at the same potential as the negative probe,change the frame of the measuring instrument to floating status.
  If by accident REFO comes in contact with GND,immediately switch the regulator or power OFF.

- Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.

- Before proceeding to further adjustments and measurements after switching regulator ON,let the player run for about one minute to allow the circuits to stabilize.

- Since the protective systems in the unit's software are rendered inoperative in test mode,be very careful to avoid mechanical and /or electrical shocks to the system when making adjustment.

- This unit is adjusted in a combination with the CD control unit (KEH-P7000, etc.). Each regulator key should be operated at the unit.
  With the KEH-P7000 taken up for reference, a description will be given below concerning how to enter into the test mode, including key operations. The key in the adjustment text is also one of the KEH-P7000 keys.

- How to enter into the test mode
  Switch ACC,back-up ON while pressing the 4 and 6 keys together.

- Resetting the test mode
  Switch ACC,back-up Off.

- Disc detection during loading and eject operations is performed by means of a photo transistor in this unit.Consequently,if the inside of the unit is exposed to a strong light source when the outer casing is removed for repairs or adjustment,the following malfunctions may occur.
  *During PLAY, even if the eject button is pressed,the disc will not be ejected and the unit will remain in the PLAY mode.
  *The unit will not load a disc.
  When the unit malfunctions this way,either re-position the light source,move the unit or cover the photo transistor.

- When loading and unloading discs during adjustment procedures,always wait for the disc to be properly clamped or ejected before pressing another key. Otherwise, there is a risk of the actuator being destroyed.

- Turn power off when pressing the button **FF** or the button **REV** key for focus search in the test mode. (Or else lens may stick and the actuator may be damaged.)

- SINGLE/4TRK/10TRK/32TRK will continue to operate even after the key is released.Tracking is closed the moment C-MOVE is released.

- JUMP MODE resets to SINGLE as soon as power is switched off.

6.2 CHECKING THE STAGE MECHANISM UNIT

1. Remove the stage mechanism unit from the CDX-P5000. (See the instructions for the CX-642 for disassembly.)

2. Remove the flexible PCB from the system unit and CD core unit (stage mechanism unit).
   (The PCB is secured to the main body with adhesive strips. Therefore, leave the PCB inside.)

3. Connect the service parts jig (CDE4793) between the system unit and CD core unit (stage mechanism unit).

4. Set a disc into the 10th tray from the bottom in the carrying case. Place the carrying case in front of the disc slit of the stage mechanism unit.
   (Be sure to place both the carrying case and stage mechanism unit on a level surface.)

5. In Test mode, insert a disc into the stage mechanism unit and confirm the operation of the loading mechanism and of playback.
   (Be sure to press the lock button shown in the figure before the disc retreats.)

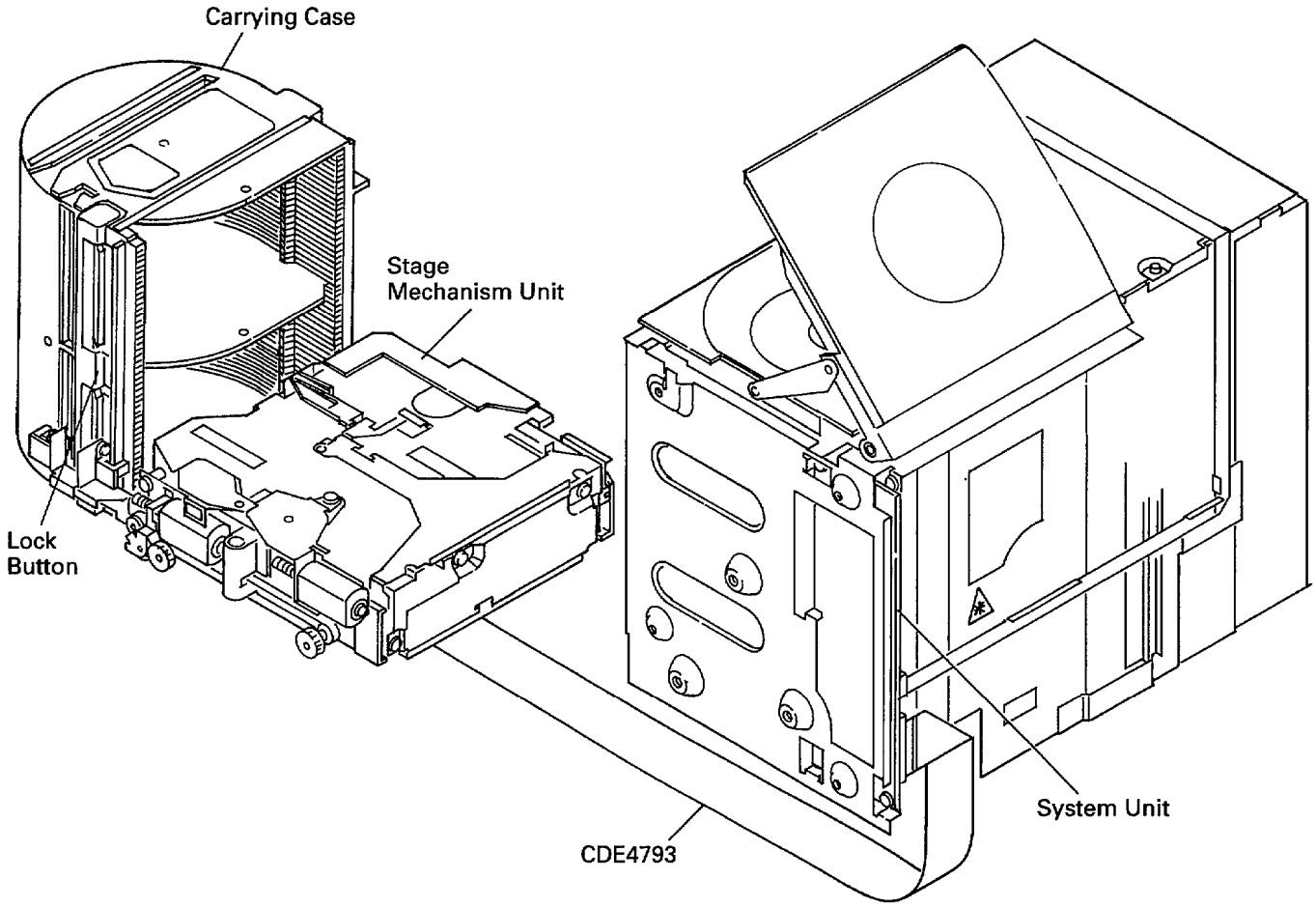


Fig.13

6.3 CHECKING THE GRATING

● Checking the Grating After Changing the Pickup Unit

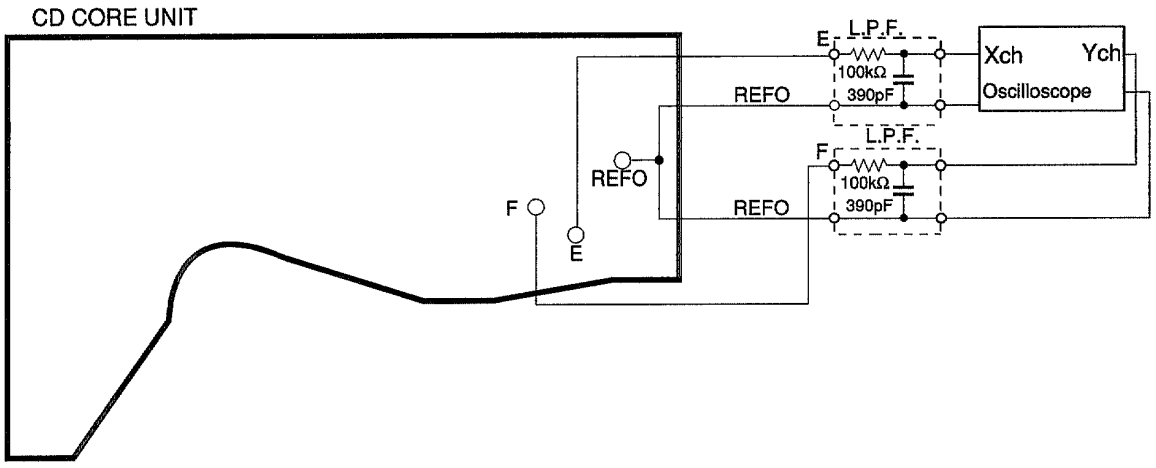
·**Note :**
Unlike previous CD mechanism modules the grating angle of the Pickup unit cannot be adjusted after the Pickup unit is changed. The Pickup unit in the CD mechanism module is adjusted on the production line to match the CD mechanism module and is thus the best adjusted Pickup unit for the CD mechanism module. Changing the Pickup unit is thus best considered as a last resort. However, if the Pickup unit must be changed, the grating should be checked using the procedure below.

·**Purpose :**
To check that the grating is within an acceptable range.

·**Symptoms of Mal-adjustment :**
If the grating is off by a large amount symptoms such as being unable to close tracking, being unable to perform track search operations, or track searching taking a long time, may appear.

·**Method :**

·Measuring Equipment	·Oscilloscope, Two L.P.F.
·Measuring Points	·E, F, REFOUT
·Disc	·ABEX TCD-784
·Mode	·TEST MODE



·**Checking Procedure**

1. In test mode, load the disc and switch the 5V regulator on.
2. Using the **FF** and **REV** buttons, move the PU unit to the innermost track.
3. Press key **9** to close focus, the display should read "91". Press key **8** to implement the tracking balance adjustment the display should now read "81". Press key **9** 4 times. The display will change, returning to "81" on the fourth press.
4. As shown in the diagram above, monitor the LPF outputs using the oscilloscope and check that the phase difference is within 75° . Refer to the photographs supplied to determine the phase angle.
5. If the phase difference is determined to be greater than 75° try changing the PU unit to see if there is any improvement. If, after trying this a number of times, the grating angle does not become less than 75° then the mechanism should be judged to be at fault.

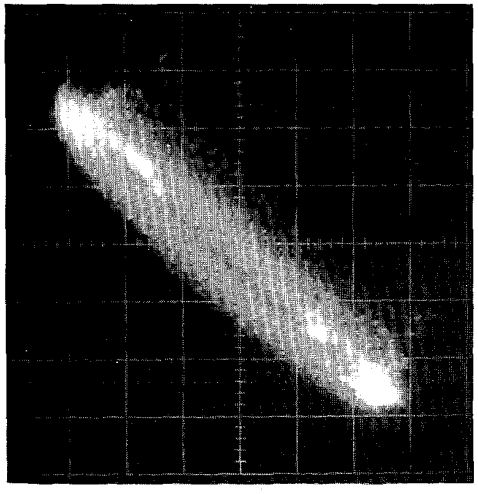
·**Note**
Because of eccentricity in the disc and a slight misalignment of the clamping center the grating waveform may be seen to "wobble" (the phase difference changes as the disc rotates). The angle specified above indicates the average angle.

·**Hint**
Reloading the disc changes the clamp position and may decrease the "wobble".

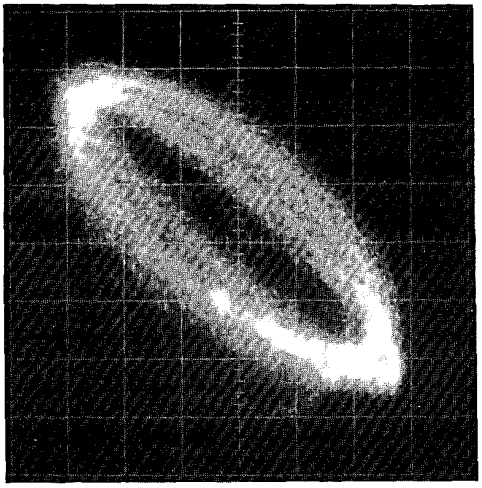
Grating waveform

Ech → Xch 20mV/div, AC
Fch → Ych 20mV/div, AC

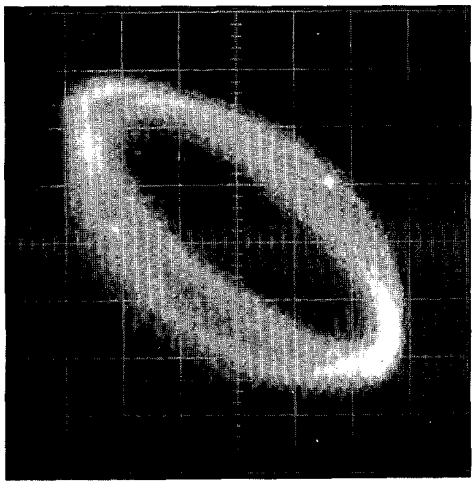
0°



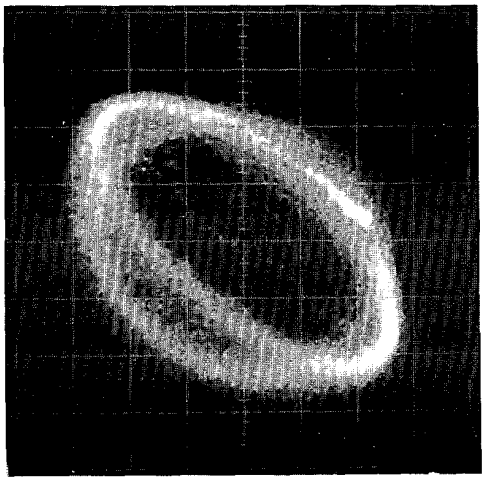
30°



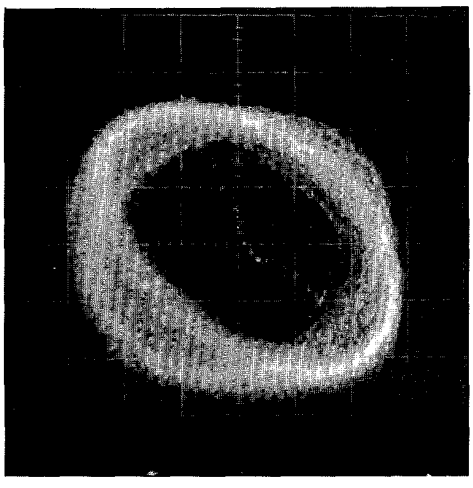
45°



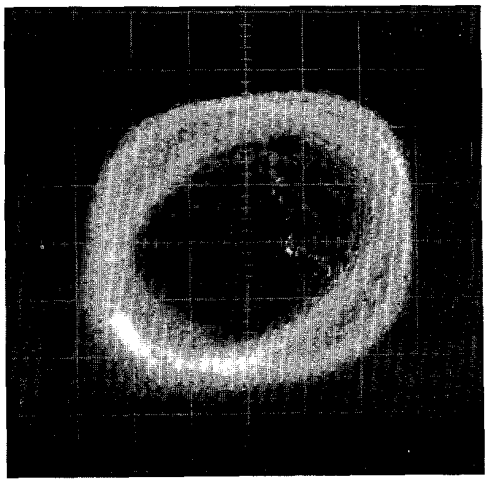
60°



75°

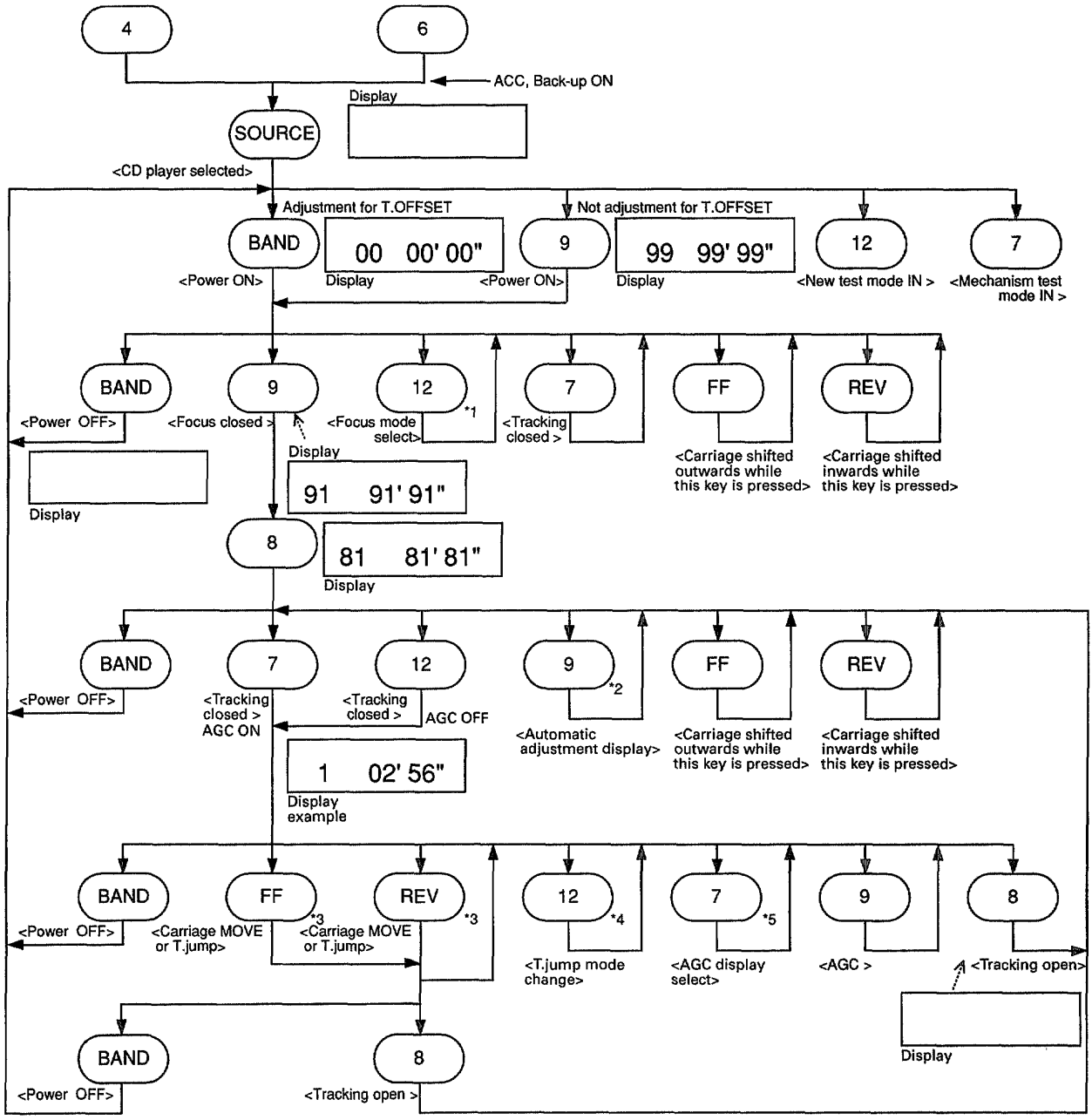


90°



6.4 TEST MODE

● Flow Chart



*1 Normal focus close (00 00' 00") → S curve check (01 01' 01") → Focus EQ check (02 02' 02") → Display

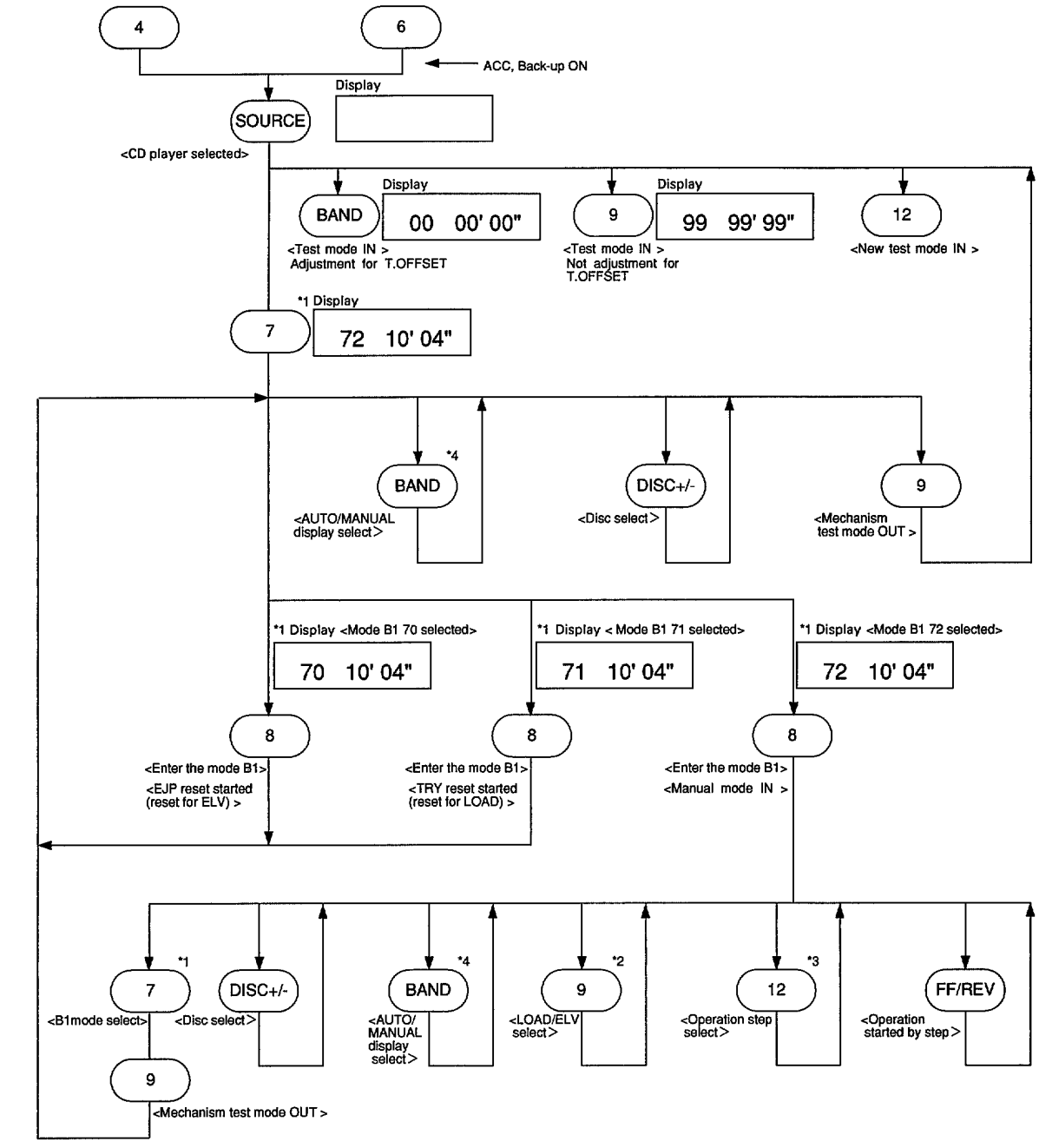
*2 Focus cancel → Tracking offset → Tracking balance → Rough servo

*3 100 TRK jump & carriage MOVE continue only while the keys are pressed

*4 SINGLE (81) → 4TRK (82) → 10TRK (83) → 32TRK (84) → 100TRK (85) → C.MOVE (86) → Display

*5 Normal display → Focus gain → Tracking gain → Focus bias

● Mechanism Flow Chart



*1 B1 mode select(TR K No.) ┌ 72(Manual mode) ⟶ 70(EJP reset) ⟶ 71(TRY reset) ┐

*2 LOAD/ELV select(MIN) ┌ 10(LOAD) ⟶ 20(ELV) ┐

*3 Operation step select(SEC) MIN10(LOAD) ┌ 00(50ms) ⟶ 01(200ms) ⟶ 02(While TRY2 ON) ⟶ 03(While TRY1/3 ON) ⟶ 04(While the keys released) ┐

MIN20(ELV) ┌ 00(8ms) ⟶ 01(40ms) ⟶ 02(First slit) ⟶ 03(10th slit) ⟶ 04(While the keys released) ┐

*4 Display Select(Change Over MIN,SEC⟷TRK No.) Use models are dividing TRK No./MIN,SEC Select.

7. GENERAL INFORMATION

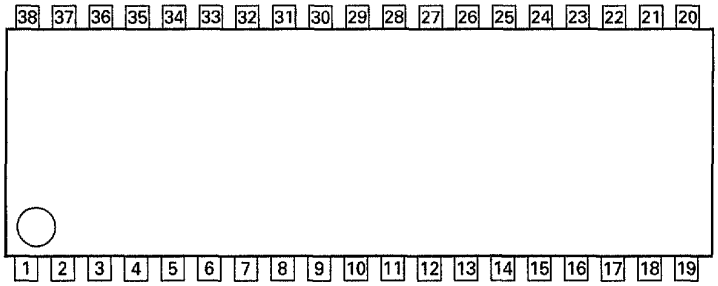
7.1 PARTS

7.1.1 IC

● **Pin Functions (UPC2572GS)**

Pin No.	Pin Name	I/O	Function and Operation
1	EFM-IN	I	EFM comparator input
2	AGC-OUT	O	AGC amplifier output
3	C. AGC		Connects AGC peak detection condenser
4	RF-IN	I	RF signal DC component cut input
5	RF-OUT	O	RF amplifier output
6	RF-	I	RF amplifier inverted input
7	C1, 3T		Connects RF3T component detection condenser
8	C2, 3T		Connects RF3T component detection condenser
9	Vcc		Power supply
10	A	I	A signal input
11	C	I	C signal input
12	B	I	B signal input
13	D	I	D signal input
14	F	I	F signal input
15	E	I	E signal input
16	PD	I	APC amplifier input
17	LD	O	APC amplifier output
18	LDON	I	Laser diode ON/OFF input
19	VREF-OUT	O	Reference voltage output
20	VREF-IN	I	Reference voltage input
21	DET-OUT	O	Vibration detection circuit output
22	DET-IN	I	Vibration detection circuit input
23	TE-OUT2	O	Tracking error amplifier output (fourfold gain)
24	TE-OUT1	O	Tracking error amplifier output (singlefold gain)
25	TE-	I	Tracking error amplifier inverted input
26	GND		GND
27	FE-	I	Focus error amplifier inverted input
28	FE-OUT	O	Focus error amplifier output
29	C.FE	I	Focus error signal DC component cut input
30	3T-OUT	O	RF3T component output
31	MIRR	O	MIRR signal output
32	RFOK	O	RFOK signal output
33	DEFECT	O	DEFECT signal output
34	C. DEF		Connects DEFECT signal detection condenser
35	EFM-OUT	O	EFM comparator output
36	ASY	I	EFM comparator level input
37	TE-BAL	I	Tracking balance control
38	FE-BAL	I	Focus balance control

UPC2572GS

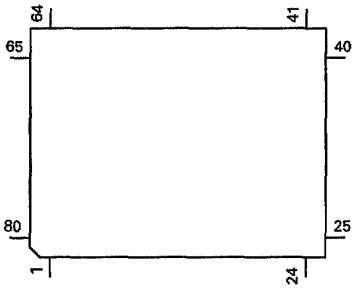


● **Pin Functions (UPD63702GF)**

Pin No.	Pin Name	I/O	Function and Operation
1	D.VDD		Supplies current of positive voltage to the logic circuits
2	$\overline{RST}$	I	System reset input pin
3	AO	I	Microcomputer interface AO="L": $\overline{STB}$ active and set to address register AO="H": $\overline{STB}$ active and set to parameter
4	$\overline{STB}$	I	Signal to latch serial data within the LSI
5	$\overline{SCK}$	I	Clock input pin to input and output serial data
6	SO	O	Outputs serial data and status signal
7	SI	I	Serial data input pin
8	D.GND		Logic circuit GND
9	X.GND		Crystal oscillation circuit GND
10	XTAL	I	Crystal oscillator connection pin
11	$\overline{XTAL}$	O	Crystal oscillator connection pin
12	X.VDD		Supplies current of positive voltage to the crystal oscillation circuit
13	DA.VDD		Supplies current of positive voltage to the D/A converter
14	R+	O	Right channel analog audio data output pin
15	R-	O	Right channel analog audio data output pin
16,17	DA.GND		D/A converter GND
18	L-	O	Left channel analog audio data output pin
19	L+	O	Left channel analog audio data output pin
20	DA.VDD		Supplies current of positive voltage to the D/A converter
21	D.VDD		Supplies current of positive voltage to logic circuit
22	FLAG	O	Flag output pin to indicate that audio data currently being output consists of noncorrectable data
23	WDCK	O	Pin to output double the frequency of LRCK
24	C16M	O	Pin to output the clock
25	EMPH	O	Output pin for the pre-emphasis data in the sub-Q code
26	DIN	I	Input pin for serial audio data
27	DOUT	O	Output pin for the serial audio data
28	SCKO	O	Output pin for the clock for the serial audio data
29	LRCK	O	Signals to distinguish the right and left channels of the audio data output from DOUT. Frequency is 44.1kHz at 50% duty at normal regeneration
30	TX	O	Output pin for the digital audio interface data
31	CTLV	I	Oscillation control pin for high-frequency clock generation VCO used for the digital PLL upon regeneration at fast speed of 2- or 4-fold
32	POUT	O	Output point for phase comparison
33	D.GND		GND for the logic circuit
34	VCO	I	Input pin for the inverter
35	$\overline{VCO}$	O	Output pin for the inverter
36	D.VDD		Supplies current of positive voltage to the logic circuit
37	PLCK	O	Pin for monitoring the bit clock
38	LOCK	O	Indicates "H" when the synchronized pattern detection signal matches the frame counter output at the EFM recovery modulation, and "L" when they don't match
39	WFCK	O	Minute-cycle signal for the bit clock, the signal indicates the cycle of 1 frame (approx. 7.35kHz)
40	RFCK	O	Minute-cycle signal for the clock, the signal indicates cycle of 1 frame (approx. 7.35kHz)
41	D.GND		GND for the logic circuit
42,43	TEST0,1	I	Test pins
44,45	TM2, TM4	I	Pins for controlling regeneration at fast speed of 2- or 4-fold
46-49	T4-T7	I	Test pins
50,51	C1D1, C1D2	O	Output pin for indicating the C1 error correction results
52-54	C2D1-C2D3	O	Output pin for indicating the C2 error correction results
55	D.VDD		Supplies current of positive voltage to the logic circuit
56	SFSY	O	Outputs 1 word of the subcode. Generally, 1 cycle is approx 136 micro seconds
57	SBSY	O	The signal indicates the beginning of the subcode block. The SFSY signal is output at high level every 98 times
58	SBSO	O	Output pin for the subcode data

Pin No.	Pin Name	I/O	Function and Operation
59	SBCK	I	Input pin for the clock signal for read-out of the subcode data
60	A.GND		GND for the analog circuit
61	MD	O	Output pin for the spindle drive
62	SD	O	Output pin for the sled drive
63	TD	O	Output pin for the tracking drive
64	FD	O	Output pin for the focus drive
65	FBAL	O	Output pin for the focus balance control
66	TBAL	O	Output pin for the tracking balance control
67	A.VDD		Supplies current of positive voltage to the analog circuit
68	TBC	I	Switches coefficient banks for the tracking filter
69	EFM	I	Input pin for the EFM signal
70	HOLD	I	Input pin for the hold control signal
71	RFOK	I	Input pin for the RFOK signal
72	MIRR	I	Input pin for the MIRR signal
73	A.GND		GND for the analog circuit
74	HOME	I	Home position detector input
75	VR1	I	The signal input through these pins is digitized to 8-bit by the A/D converter, which by operation of the assigned register, can be read into the microcomputer
76	FE	I	Inputs a focus-error signal from the RF amplifier
77	TE	I	Inputs a tracking-error signal from the RF amplifier
78	TEC	I	Input pin for the tracking comparator
79	REFOUT	O	Output point for midpoint potential for the A/D converter for the LSI portion
80	A.VDD		Supplies current of accurate voltage to the analog circuit

*UPD63702GF

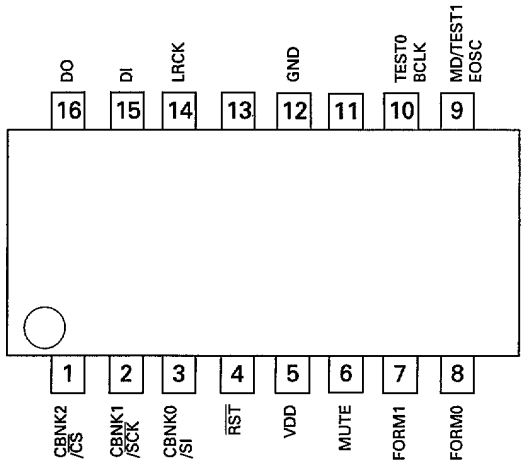


IC's marked by are MOS type.*
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

● Pin Functions (PD4501B)

Pin No.	Pin Name	I/O	Function and Operation
1	CBNK2/$\overline{CS}$	I	CROM bank select signal input/Chip select
2	CBNK1/SCK	I	CROM bank select signal input/Clock
3	CBNK0/SI	I	CROM bank select signal input/Data
4	$\overline{RST}$	I	Reset signal input
5	VDD		Power supply
6	MUTE	I	Mute control input
7	FORM1	I	Bit clock rate select signal input
8	FORM0	I	Bit clock rate select signal input
9	MD/TEST1	I	CROM bank select /test mode select
10	TEST0	I	Test mode select
11	EOSC	I	External clock input
12	GND		GND
13	BCLK	I	Bit clock signal input
14	LRCK	I	L/R clock signal input
15	DI	I	Audio data serial input
16	DO	O	Audio data serial output

*PD4501B



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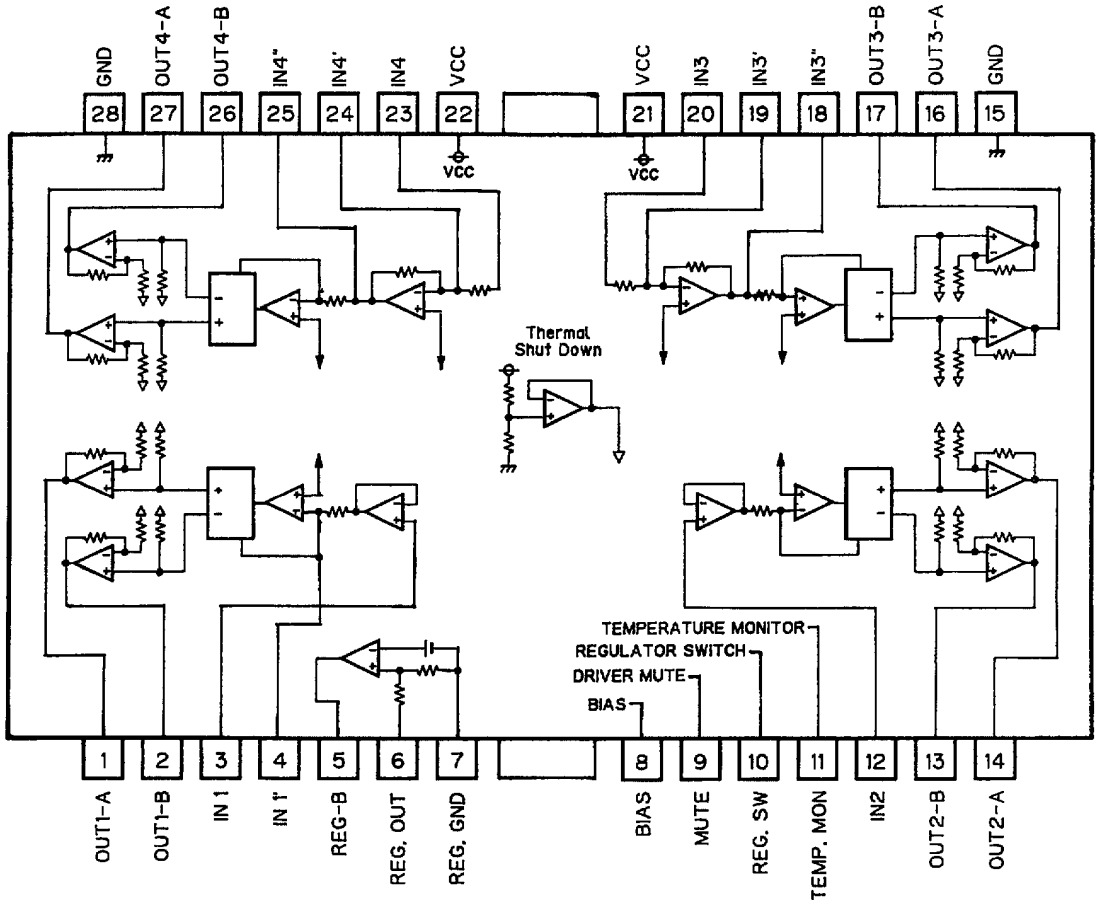
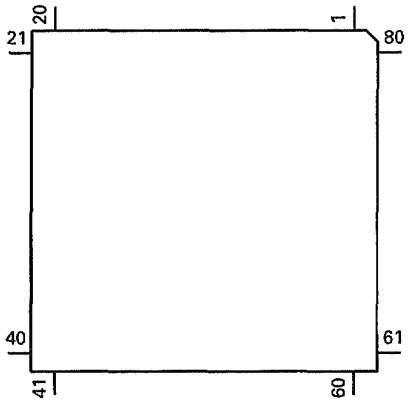
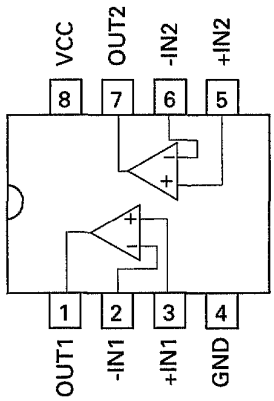


*PD5349B



XLA4558F-P



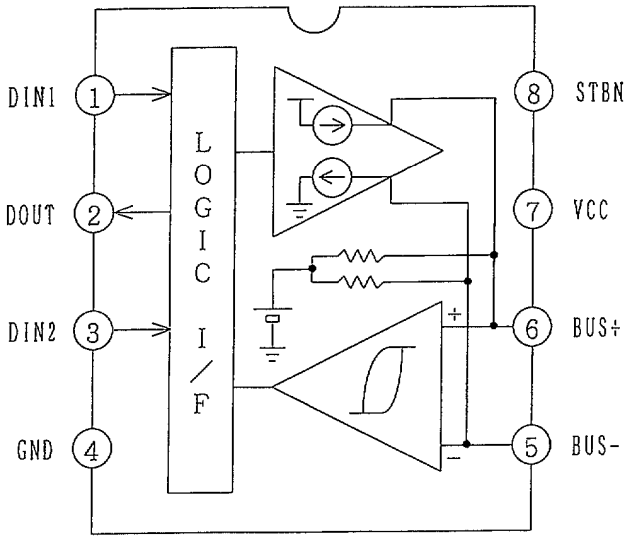
● **Pin Functions (PD5349B)**

Pin No.	Pin Name	I/O	Format	Function and Operation
1	KEYDCD	I		Analog key input
2	$\overline{\text{P1DOOR}}$	I		+1 DISC door OPEN/CLOSE detect
3	CSI	I		IP-BUS data input
4	CSO	O	C	IP-BUS data output
5	IPPW	O	C	Power supply control output for IP-BUS interface IC
6	XA0	O	C	Control signal distinguishing data from microcomputer
7	XSCK	O	C	LSI clock output
8	XS0	O	C	LSI data output
9	XS1	I		LSI data input
10	$\overline{\text{XSTB}}$	O	C	CD LSI strobe output
11	$\overline{\text{XRST}}$	O	C	CD LSI reset output
12	DCE	O	C	PD4501 mute output
13	POWER	O	C	CD +5V control
14	ASENS	I		ACC power sense input
15	$\overline{\text{BSENS}}$	I		Back up power sense input
16	TRAY1	I		Loading detect switch
17	TRAY2	I		DISC clamp detect switch
18	TRAY3	I		DISC insert detect switch
19	I1	O	C	Motor driver control output
20	I2	O	C	Motor driver control output
21	I4	O	C	Motor driver control output
22	$\overline{\text{DOPEN}}$	I		Door open sense input
23	$\overline{\text{DCLOSE}}$	I	C	Door close sense input
24	$\overline{\text{P1EJSW}}$	I		EJECT KEY(+1DISC) SW interrupt input
25	$\overline{\text{RESET}}$	I		Reset input
26	CONT	O	C	Servo driver power control output (CD)
27	$\overline{\text{OPTSW}}$	I		Digital output ON/OFF input
28	XIN	I		Crystal oscillating element connection pin
29	XOUT	O		Crystal oscillating element connection pin
30	VSS			GND
31-38	D7-D0	I/O	C	External RAM data
39	WE	O	C	External RAM write enable
40	PROT	O	C	External RAM output enable
41	CS	O	C	External RAM chip select
42-54	A12-A0	O	C	External RAM address BUS input
55	$\overline{\text{EJP}}$	I		Eject position switch
56	UNIT	I		Unit input
57	MUTE	O	C	Mute control output
58	MIRR	I		Mirror detector input
59	LOCK	I		Spindle lock detector input
60	FOK	I		FOK signal input

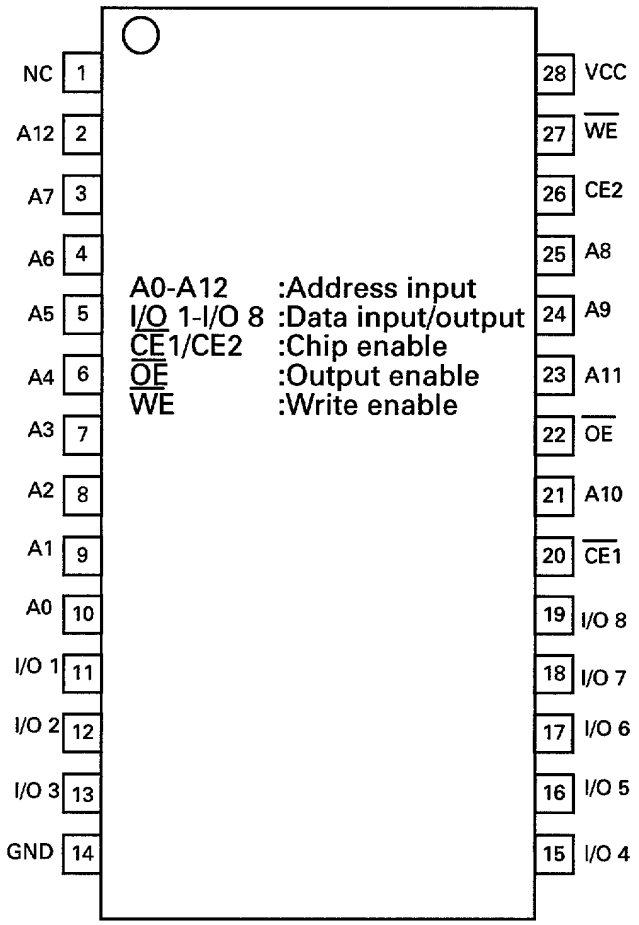
Pin No.	Pin Name	I/O	Format	Function and Operation
61,62	NC			Not used
63	$\overline{\text{MAG}}$	I		Magazine lock switch
64	$\overline{\text{P1DISK}}$	I		+1 DISC detect
65	$\overline{\text{LINH}}$	O	C	LCD driver reset output
66	EXSCK	O	C	LCD driver clock output
67	ILM	O	C	LCD illumination control output
68	EXSO	O	C	LCD driver data output
69	LCE	O	C	Chip enable output pin for LCD driver
70	$\overline{\text{TESTIN}}$	I		Test program mode input
71	VCC			5V
72	VREF	I		A/D converter reference voltage input
73	AVSS	I		A/D GND
74	DSENS	I		Disc sense input
75	NC			Not used
76	$\overline{\text{DISK}}$	I		Disc detector input
77	$\overline{\text{TSEL}}$	I		Tray position detector photo sensor
78	CSEL	I		Compression select
79	VDIN	I		Power supply short sensor input
80	TEMP	I		Temperature detector

Format	Meaning
C	C MOS

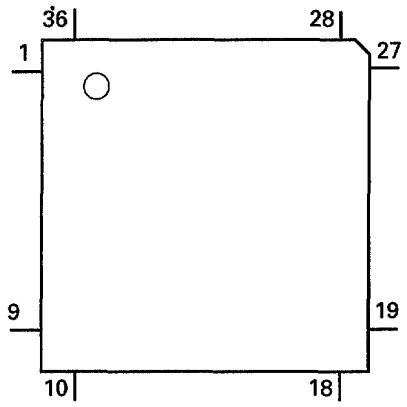
CA0008AM



LH5168HN-10L



*LC75842E

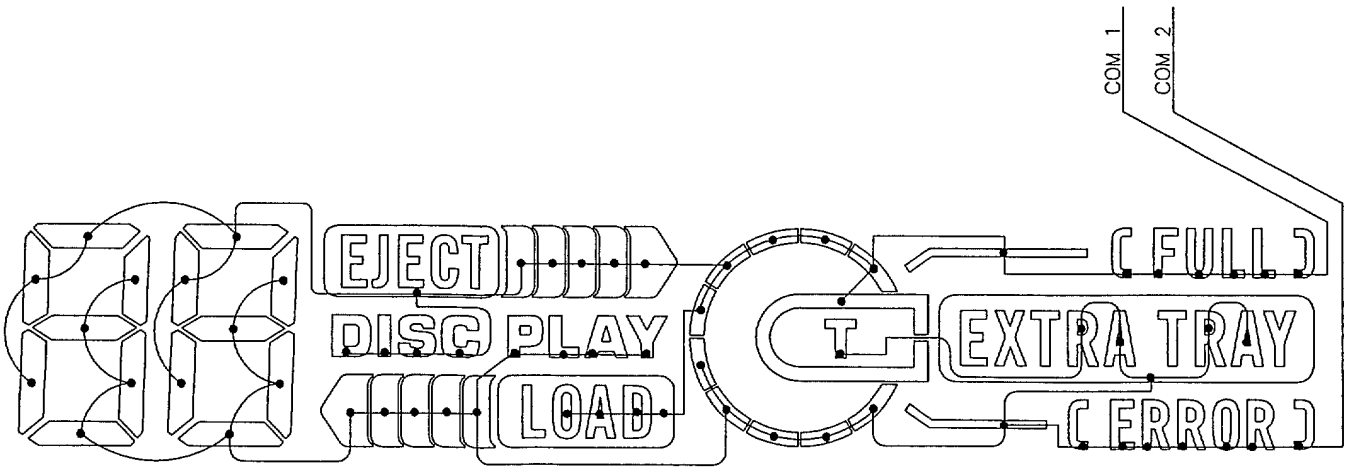


Pin Functions (LC75842E)

Pin No.	Pin Name	I/O	Function and Operation
1–27	S1-S27	O	LCD segment output
28	OSC		Oscillator connection pin
29	VDD		Power supply
30	$\overline{\text{INH}}$	I	Inhibit input
31	VSS		GND
32	CE	I	Chip enable input
33	CL	I	Synchronizing clock input
34	DI	I	Data input
35,36	COM2,1	O	LCD common output

7.1.2 DISPLAY

COMMON



SEGMENT

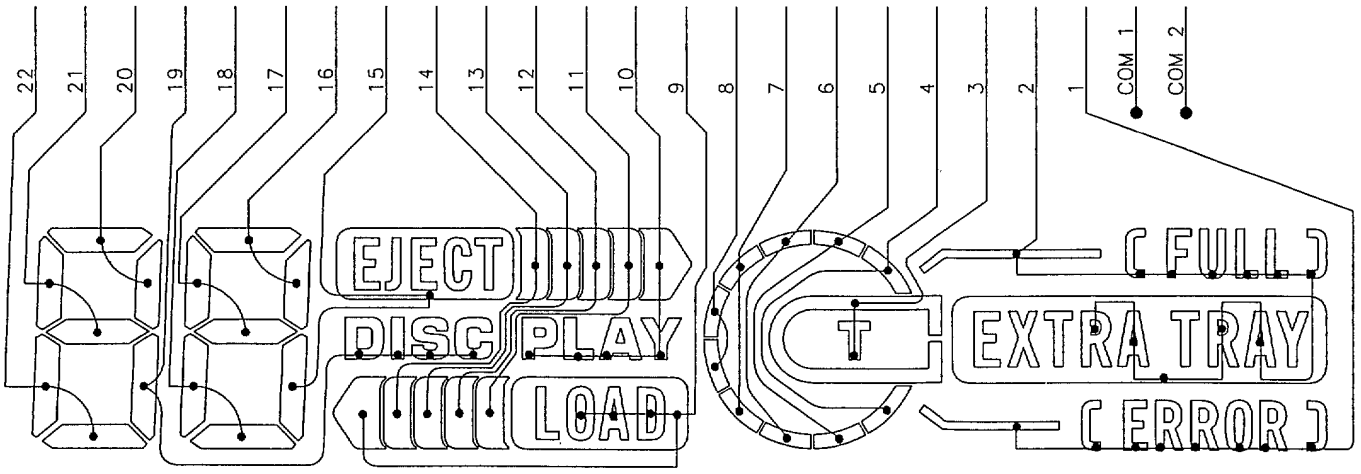


Fig.14

7.2 DIAGNOSIS

7.2.1 DISASSEMBLY

● Removing the Case

1. Remove the twelfth screws.
2. Remove the parts indicated with an arrow.
3. The case is held at Part A indicated in the illustration. Pivot the case around Point A to remove.

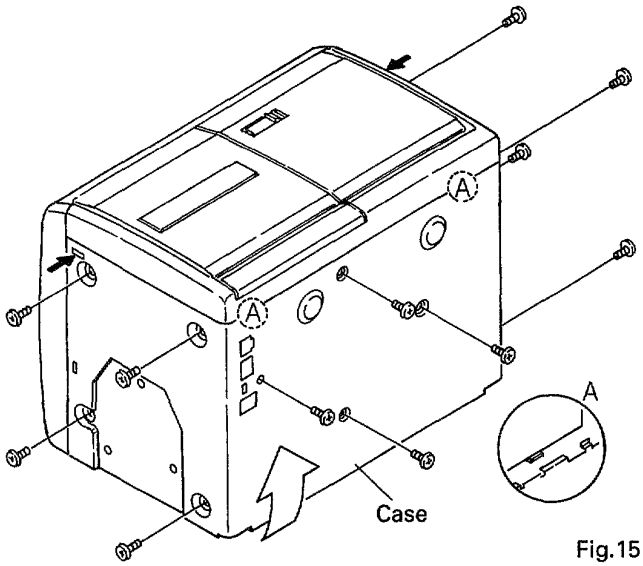


Fig.15

● Removing the Door Unit

1. Open the door unit.
2. Remove the two screws.
3. Slide the door unit toward the rear and release the lock, then lift the door unit to remove.

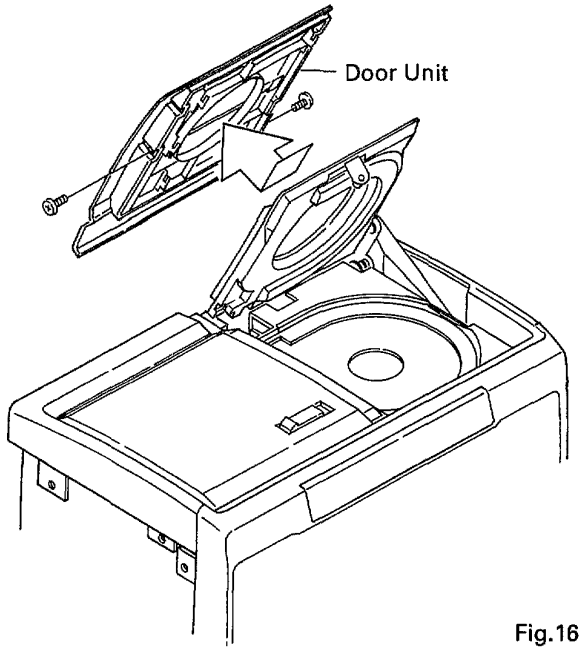


Fig.16

● Removing the Grille Unit(Top)

1. Remove the two screws.
2. Lift the rear part of the grille unit by using Point A as a supporting point, and remove the grille unit. (The grille unit is held at Part B. Lightly push the tray down.)

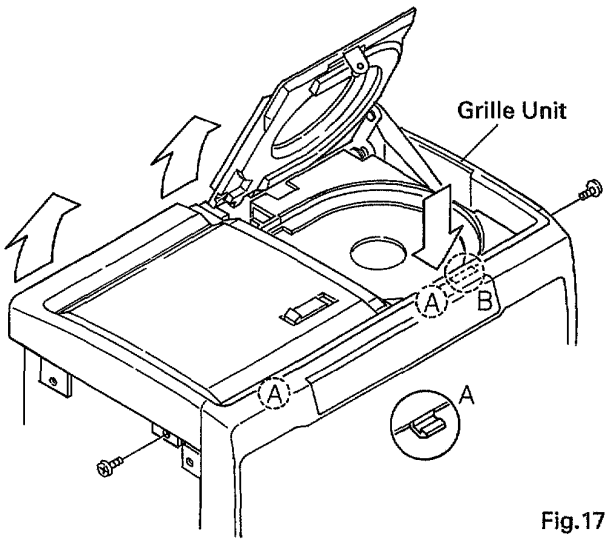


Fig.17

● Removing the Grille Unit(Front)

1. Remove the two screws.
2. Remove the four tabs indicated with an arrow. Remove the grille unit.
3. Remove the connector.

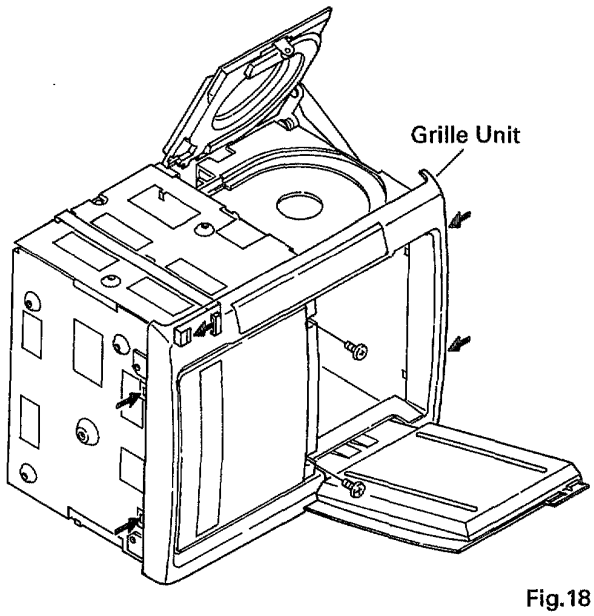


Fig.18

● **Removing the Door Unit**

1. Change the position of the spring to the door side, as indicated in the figure by the arrow mark.
2. Remove the two screws to remove the holder unit.
3. Remove the two screws to remove the damper unit.
4. Remove the door unit, while taking attention to the shaft.
   Be sure to install the spring to its original position when assembling the door unit.

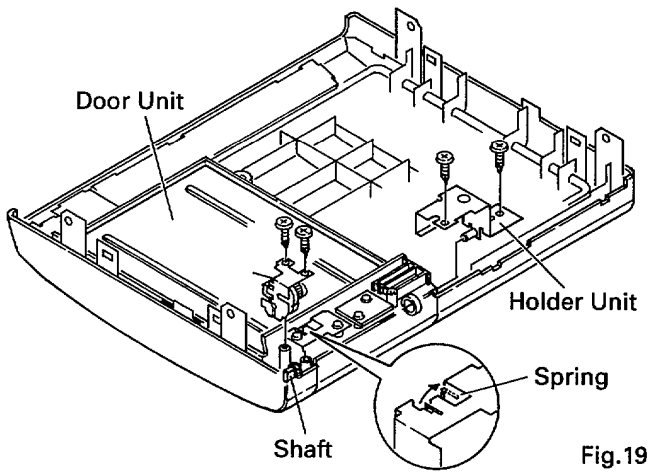


Fig.19

7.2.2 PARTS LOCATIONS

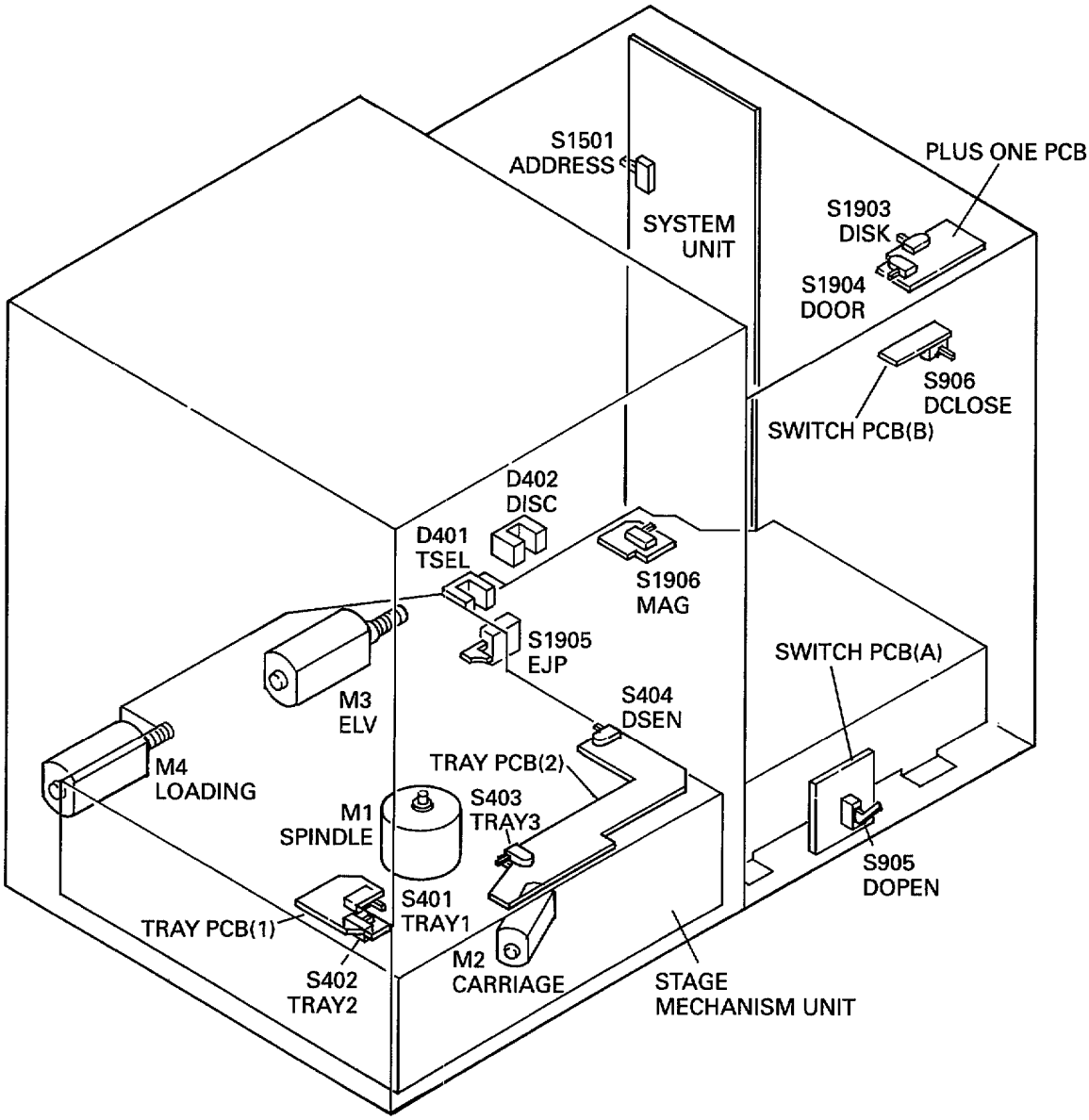


Fig.20

7.2.3 TEST MODE

● New Test Mode(aging operation and setup analysis)

The single CD player plays in normal mode. After being set up, it will display FOK (focus), LOCK (spindle), subcode, sound skip, protection against a mechanical error or the like, occurrence of an error, cause and time of an expiry, if any, (and disc number)

During the setup, the CD software operation status (internal RAM and C-point)is displayed.

(1) How to enter NEW TEST Mode

See the test mode flow chart Page 32.

(2) Relations of keys between TEST and NEW TEST Modes

Keys	Test Mode		New Test Mode		Mechanism Test Mode
	Regulator OFF	Regulator ON	PLAY in progress	Error Occurred, Protection Activated	
BAND	Regulator ON	Regulator OFF	—	Time of occurrence/ cause of error select	Back to the test mode
FF	—	FWD-Kick	FF/TRACK+	—	Playing the mechanism
REV	—	REV-Kick	REV/TRACK-	—	Playing the mechanism
7	—	Tracking close	SCAN	—	Mechanism test mode in
8	—	Tracking open	MODE	—	—
9	—	Focus close	—	—	TRAY/ELV select
12	To New Test Mode	Jump Mode Select	AUTO/MANU	TRACK No./ time of occurrence select	Operation step select

Operations,such as EJECT, CD ON/OFF, etc. are performed normally

(3) Error Cause (Error Number) Code

Error Code	Classification	Mode	Description	Cause/Detail	
40	ELECTRIC	PLAY	FOK=L 100ms	Put out of focus	Scratch, Stain, Vibration, Servo defect, etc...
41	ELECTRIC	PLAY	LOCK=L 100ms	Spindle unlock	
42	ELECTRIC	PLAY	Subcode unacceptable 500ms	Failed to read subcode	
43	ELECTRIC	PLAY	Sound skipped	Last address memory operated	

(4) Indicating an Operation Status During Setup

Status No.	Description	Protection operation
01	Carriage home mode started	None
02	Carriage moving inwards	10-second time out, Home switch failed
03	Carriage moving outwards	10-second time out, Home switch failed
05	Carriage moving outwards	None
11	Setup started	None
12	Spindle turn/Focus search started	None
13	Waiting for focus closure (XSI=L)	Failure to close focus
10,14	Waiting for focus closure (FOK=H)	Failure to close focus
15, 16, 17	Focus closed, Tracking open	Focus disrupted
18	During focus AGC	Focus disrupted
19	During tracking AGC	Disrupted focus
20	Waiting for MIRR, LOCK or subcode read Carriage closed, SPINDLE=ADAPTIVE	Focus disrupted, MIRR NG, Failure to lock, failed to read subcode

(5) Example of Display.

·SET UP in progress
8 digits display LCD

TNo.	Min	Sec
11	11	11

·Operation (PLAY, SEARCH, etc.) in progress perfectly identical with that in the normal mode.

·Protection/Error upon occurrence(8 digits display LCD)

(a) Error number indicated

ERROR–xx

Select the display with the BAND key.

(b) Track number and absolute time indicated

TNo.	Min	Sec
10	40	05

● Error Number Indication

If the CD should fail to operate or if an error has taken place during operation the player will enter into the error mode, and the cause of the error will be numerically indicated.
This is aimed at assisting in analysis or repair.

(1) Basic Means of Display

·Examples of Display ERROR-xx

(2) Error Codes

Error Code	Classification	Description	Cause/Detail
10	ELECTRIC	Carriage home failure	Carriage doesn't move to or from the innermost position →Home switch failed and/or carriage immobile
11	ELECTRIC	Focus failure	Focus failed →Defects, disc upside-down, severe vibration
12	ELECTRIC	SETUP failure Subcode failure	Spindle failed to lock or subcode unreadable →Spindle defective, defect, severe vibration
14	ELECTRIC	Mirror failure	Unrecorded CD-R The disc is upside-down, defects, vibration
17	ELECTRIC	Set up failure	AGC protect failed →Defects, disc upside-down, severe vibration
19	ELECTRIC	Set up failure	Tracking error waveform is too unbalanced (>50%) or level is too small →The P.U.unit or tracking error circuitry is N.G.
30	ELECTRIC	Search time out	Failed to reach target address →Carriage/tracking defective and/or defects
A0	SYSTEM	Power failure	Power overvoltage or short circuit detected →Switching transistor defective and/or power abnormal
A1	SYSTEM	Mechanism power failure	Mechanism elevation reference voltage is out of prescription →EREF adjustment VR and/or power abnormal
04	Mechanism (EJECT)	MAG SW OFF time out	Although the stage has elevated to the EJECT point, the MAG switch cannot be removed. → Incorrect setting of the EJP switch. The gap between the C/C and chassis is too small.
26	Mechanism (LOAD)	Improper half clamping or clamping	The stage mechanism is clamped without disc sense. → Either the TRAY2 or TRAY3 switch is defective.

Error Code	Classification	Description	Cause/Detail
50	Mechanism (EJECT)	C/C EJECT time out	The C/C cannot be ejected (cannot reach the EJECT point). → The disc has stopped during transfer. The ELV mechanism is locked.
60	Mechanism (LOAD)	Clamping/half clamping/storage time out	Cannot reach the points of TRAY 1, 2 and 3. → The mechanism is locked.
67	Mechanism (LOAD)	DSENS NG	The disc is removed from the claws during clamping or half clamping. The disc is left between the C/C and stage mechanism. → Defective claws
70	Mechanism (ELV)	Elevation DOWN time out	Cannot reach the desired disc. TSEL continued in High or Low for 4 sec. → The mechanism is locked. The mechanism is stuck at the bottom. The disc is stuck somewhere.
72	Mechanism (ELV)	Improper TSEL chattering	TSEL does not stabilize in Low (less than 1.0 V) within 64 ms. → Excessive vibration
73	Mechanism (ELV)	Dislocated elevation	TSEL does not remain in Low (less than 1.0 V) for 6 ms. TSEL was in High when elevation began. The stage mechanism descended beyond the specified slit and stopped at the next slit. After braking, TSEL was in High. → Excessive vibration
74	Mechanism (ELV)	Improper elevation position	The EJP switch was set to ON during elevation of the stage from Disc 2 to Disc 51. → Detective EJP switch or excessive vibration
75	Mechanism (ELV)	Opening of the door with extra time out	The door of extra tray opened during elevation, and more than 30 sec elapsed. → The door of extra tray is open.
76	Mechanism (ELV)	Elevation UP with time out	The stage cannot reach the desired disc. TSEL continued in High or Low for 4 sec. → The mechanism is locked. The mechanism is stuck at the bottom. A disc is stuck somewhere.
80	Mechanism (C/C)	NO MAG NG	No disc is set in the C/C.
90	Mechanism (DISC)	Improper disc ejection	There is no place to eject a half-clamped disc. The door of the extra tray is open. → The trays for Discs 1 to 51 are full (DISC FULL), or the trays for Discs 1 to 50 are full (DISC FULL) and the door of extra tray is open.

C/C : Carrying Case

7.3 BLOCK DIAGRAM

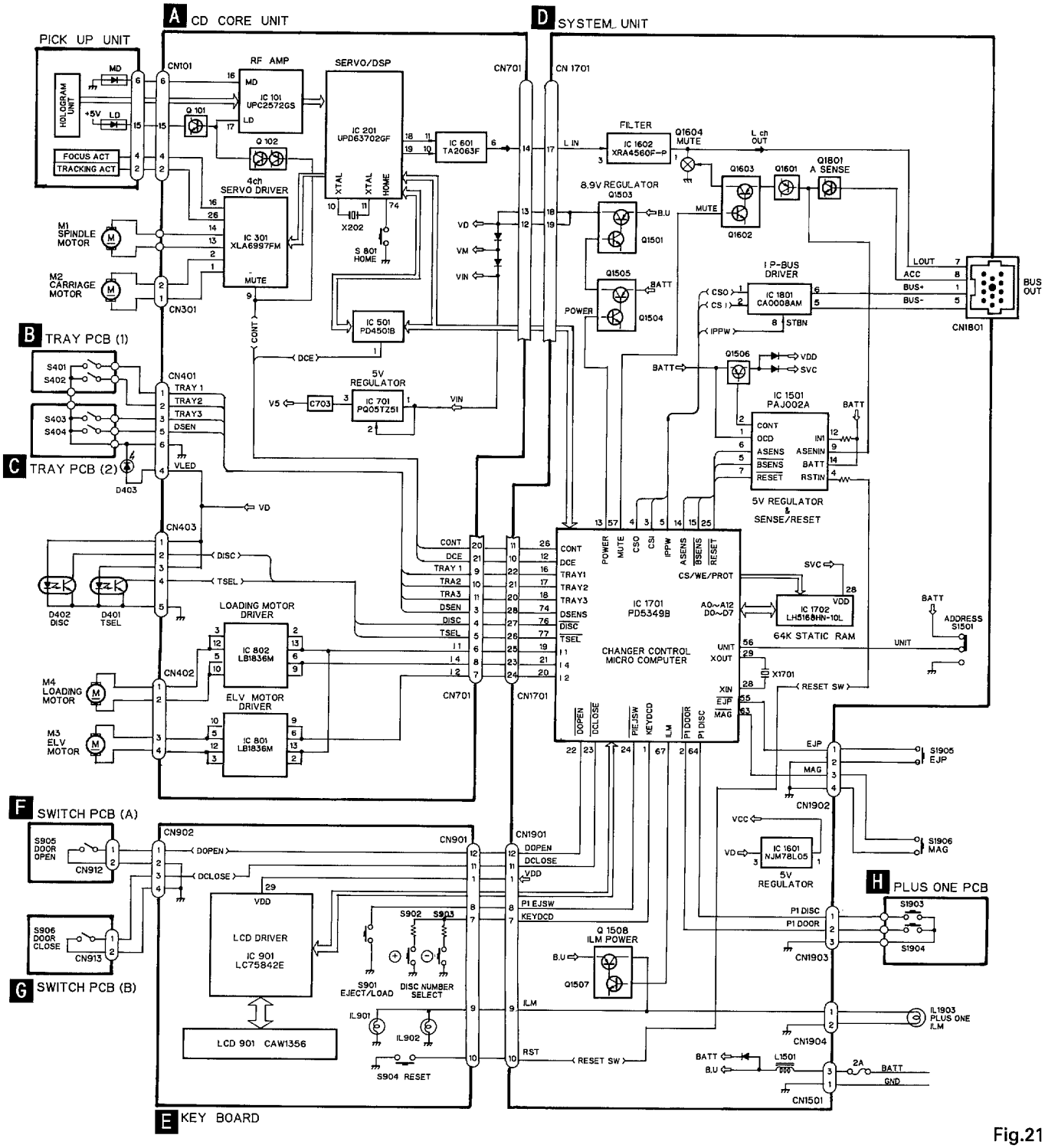
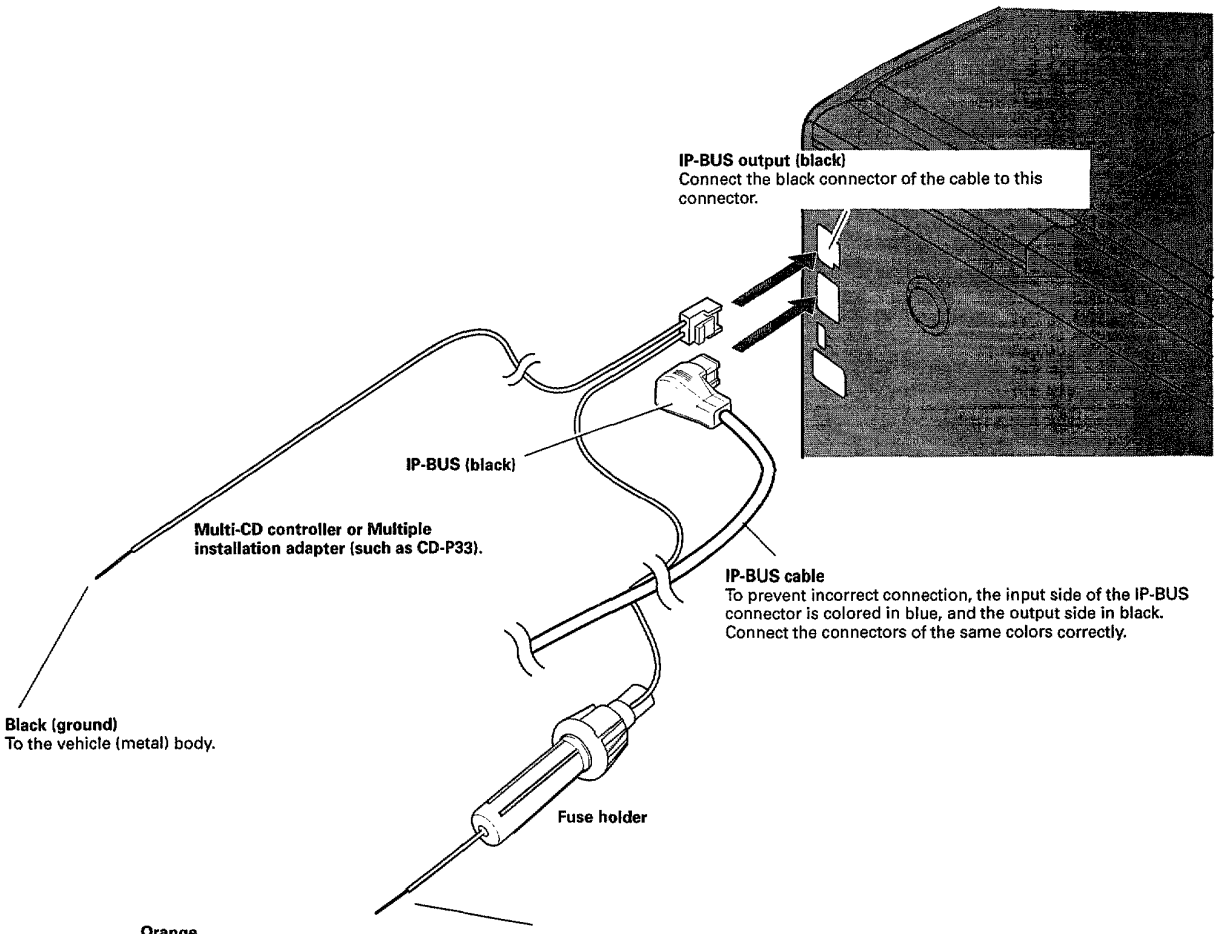


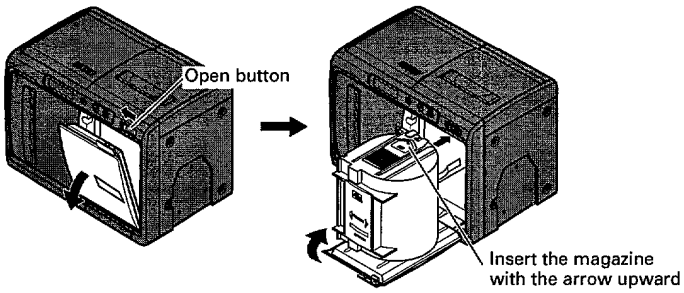
Fig.21

8. OPERATIONS AND SPECIFICATIONS

Connecting the Units


IP-BUS output (black)
Connect the black connector of the cable to this connector.
IP-BUS (black)
Multi-CD controller or Multiple installation adapter (such as CD-P33).
IP-BUS cable
To prevent incorrect connection, the input side of the IP-BUS connector is colored in blue, and the output side in black. Connect the connectors of the same colors correctly.
Black (ground)
To the vehicle (metal) body.
Fuse holder
Orange
To the terminal always supplied with power regardless of ignition switch position.

Loading the magazine

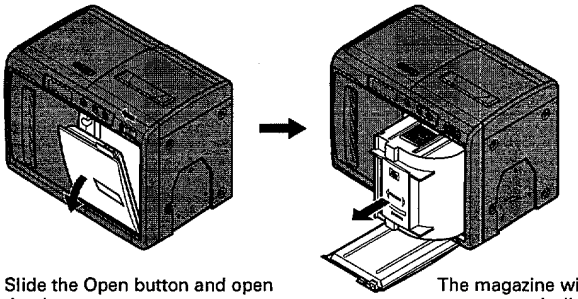


Slide the Open button and open the door.

Push the magazine in until it locks, then close the door.

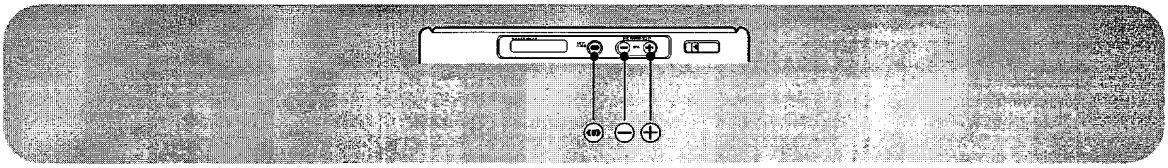
- Always keep the door closed except when loading or unloading a magazine. The player will not operate if the door is open.
- Do not pull on a magazine when it is locked in place. It could cause the player to break down.

To remove the magazine



Slide the Open button and open the door.

The magazine will come out automatically.



Loading the Discs in the magazine in the selected order

1. Set the source on Multi-CD. (See Page 50.)

If the Source is switched to a device other than Multi-CD, or the ignition switch is turned OFF, pressing ⏭ makes it possible to load one disc in the extra tray. In that case, complete this operation within a period of 8 seconds.

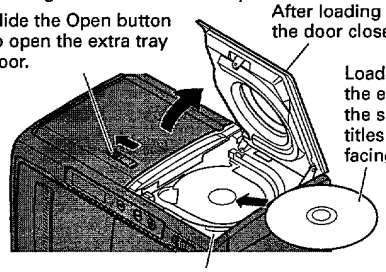
2. Inserting disc.

Loading a disc in the extra tray

Slide the Open button to open the extra tray door.

After loading the disc, push the door closed until it clicks.

Load the CD in the extra tray with the side with song titles printed on it facing upwards.



Load a disc in the extra tray.

3. Press ⊕ or ⊖ to input the number of the disc you want to load.

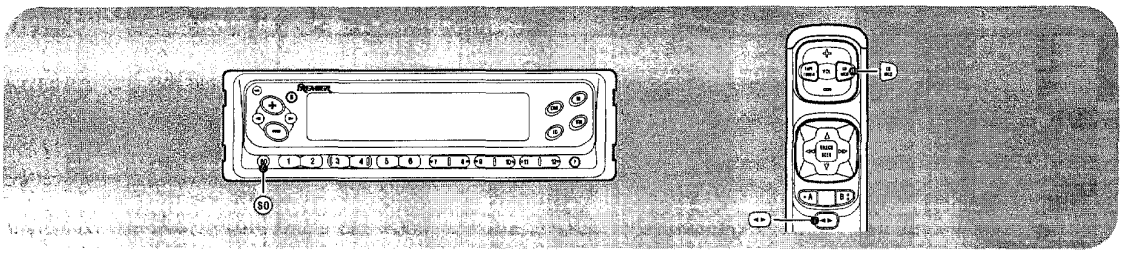
This lights up if a disc is loaded in the extra tray. It blinks if the extra tray is open.

Number of disc you want to load

4. Press ⏭ to move the disc.

This is displayed while the disc is being moved.

Except when unloading or loading a disc, keep the door closed at all times. The player will not function if the door is open.



Start the CD player

■ **Multi-CD controller**

Press the (50) button until it becomes multi-CD.

■ **Remote controller**

Press the (50) button until it becomes multi-CD.

Playing of the multi-CD begins and the 50-disc multi-CD operation state is displayed.

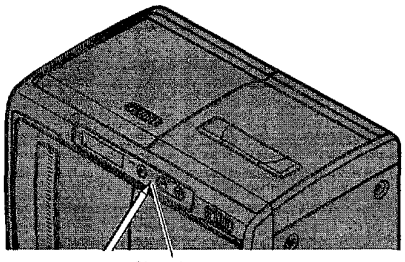
When 2 or more multi-CD players have been connected:

Press the (⇔) button until it becomes a 50-disc multi-CD.

50-disc multi-CD

When a magazine is set, it is checked automatically to determine if there are any discs inside. Also, concerning ITS Play, Music Group Play, Frequency Play, Disc eject, "ABC" Disc Title Search and other functions provided by the combined multi-CD controller, these will not operate if a disc has not been read. In that case, switch to a source other than the 50 Play Multi CD. During that time, the disc will be read automatically.

Pressing the Clear Button



Clear button

After connecting everything up, press the clear button with the tip of a pencil. If the power will not switch on, or if the CD player does not operate, when the button on the control unit is pressed, or if the control unit display is incorrect, press this button with the tip of a pencil to restore normal operation.

Specifications

CD Player unit
System ..... Compact disc audio system
Usable discs ..... Compact Disc
Signal format
..... Sampling frequency: 44.1 kHz
Number of quantization bits: 16; linear
Power source
..... 14.4 V DC (10.8 – 15.1 V allowable)
Max. current consumption ..... 1.0 A
Weight ..... 5.0 kg
Dimensions
..... 300 (W) × 238 (H) × 201 (D) mm

Note:
Specifications and the design are subject to possible modification without prior notice due to improvements.

PIONEER®
The Art of Entertainment

Service Manual

ORDER NO.
CRT1927

CD MECHANISM MODULE

CX-642

- **This service manual describes operation of the CD mechanism incroporated in models listed in the table below.**
- **When performing repairs use this manual together with the specific manual for model under repair.**

Model	Service Manual	CD Mechanism Unit
CDX-P5000	CRT1914	CXK4300

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1. MECHANISM DESCRIPTION 2
2. DISASSEMBLY 12
3. CIRCUIT DESCRIPTION 15

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1. MECHANISM DESCRIPTION

● Carrying case

1. The disc will be locked inside the carrying case with the stop arm.
2. When the carrying case is inserted into the mechanism, the stop arm rotates to a position where it can no longer act to insert/eject of the disc.
3. When the case is loaded in the mechanism, the spring prevents the disc from being pushed out of the carrying case.

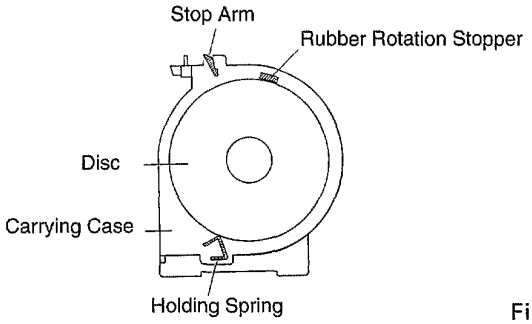


Fig.1

● Inserting the carrying case

1. The EJ lever has been pushed forward when no carrying case had been inserted (EJECT mode). Therefore, the slide shaft is pushed by the cam of the EJ lever, and the locking lever is positioned to the right.
2. When the carrying case is inserted, the EJ lever is pushed toward the rear, whereupon the locking lever starts shifting toward the left. This is performed after the locking roller of the locking lever has moved to within the grasp of the carrying case lock.
3. Once the carrying case is inserted completely, the locking roller engages the carrying case lock to lock the case. The MAG switch is set to ON.
4. The same structure is provided for both the upper and lower locking levers except for the shape of the EJ lever's cam and the switch. To prevent only the upper or lower lever from being locked, the locking operations of the upper and lower locking levers are synchronized.

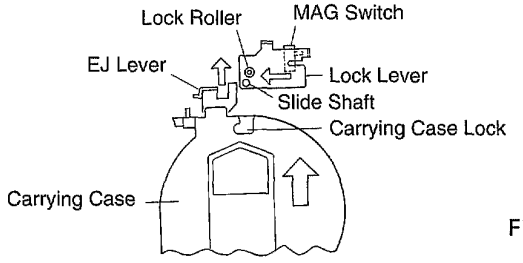


Fig.2

● Ejecting the carrying case

1. When the stage mechanism is lowered to the EJECT position, the end of the EJ arm is pushed so that the arm rotates, whereupon the interlocked arm rotates.
2. Through the rotating operation of the interlocked arm, the upper and lower locking levers shift toward the right, and the upper and lower locking rollers are unlocked from the carrying case. The MAG switch is set to OFF.
3. The carrying case itself is pushed by the EJ lever and ejected from the mechanism. However, stroke of the upper EJ lever is different from that of the lower EJ lever. The upper EJ lever is designed to be shorter merely to facilitate unlocking of the carrying case. (This also improves stability of locking.)

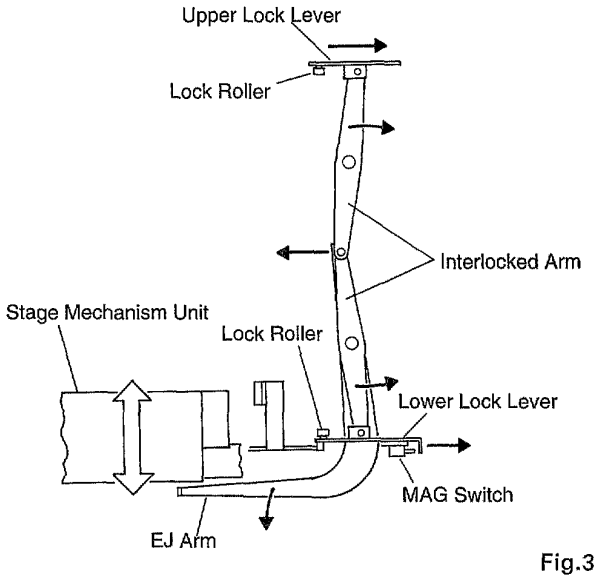


Fig.3

● Detection of a disc

1. The system detects whether the inserted carrying case contains a disc or not. (TOC will be detected separately later.)
2. The system detects a disc using the photointerrupters (TSEL and DISC) provided in the stage mechanism. The system counts the discs using the TSEL photointerrupter during the ELV operation. At the same time, the DISC photointerrupter detects the DISC detection arm being pushed out by the disc so that the system can determine the position of the disc.
3. Unlike conventional mechanisms that detect the existence of a disc when taking out the tray, the present system will never attempt to load an nonexistent disc.

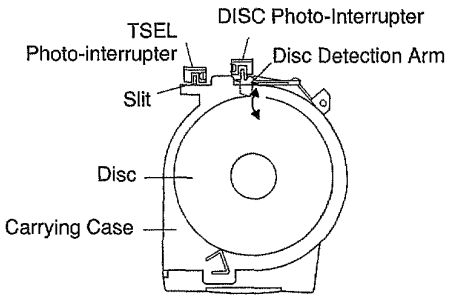


Fig.4

● Counting the discs

1. Discs are counted with the TSEL photointerrupter.
2. To prevent dislocation in height caused by expansion/contraction of the carrying case with changes in temperature, the slit for TSEL detection is integrated into the carrying case. Discs in the extra tray (Nos. 51 and 0) are not be counted, since there are gaps between the extra tray and the EJ position.
3. The EJP switch is the home switch for ELV. After detecting the switch, the system counts the discs in the ascending direction.
4. The carrying case is ejected when the system counts -1 from 0.
5. As shown in the illustration at right, the signal waveforms for disc detection are widely set. According to the results of disc detection following finalization of TSEL detection, the system judges whether there is a disc or not. The aforementioned DISC detection arm switches the light of the photosensor ON/OFF by retreating if there is a disc, or remaining as-is if there is no disc.

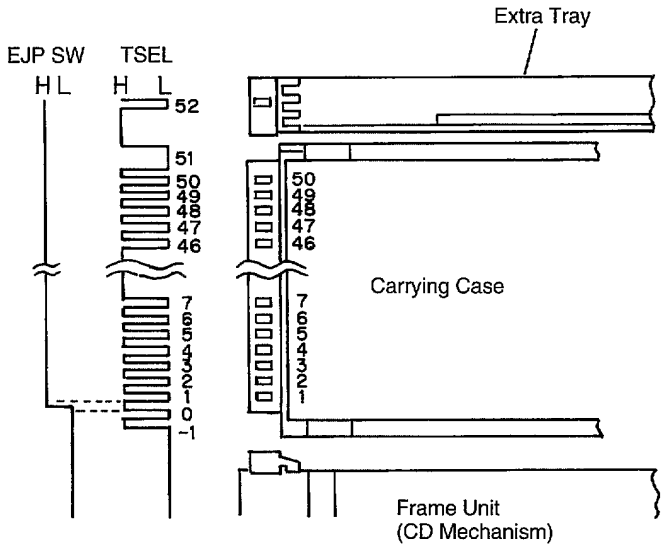


Fig.5

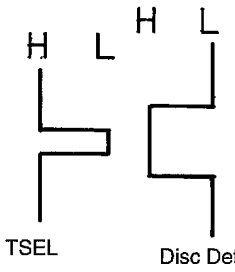
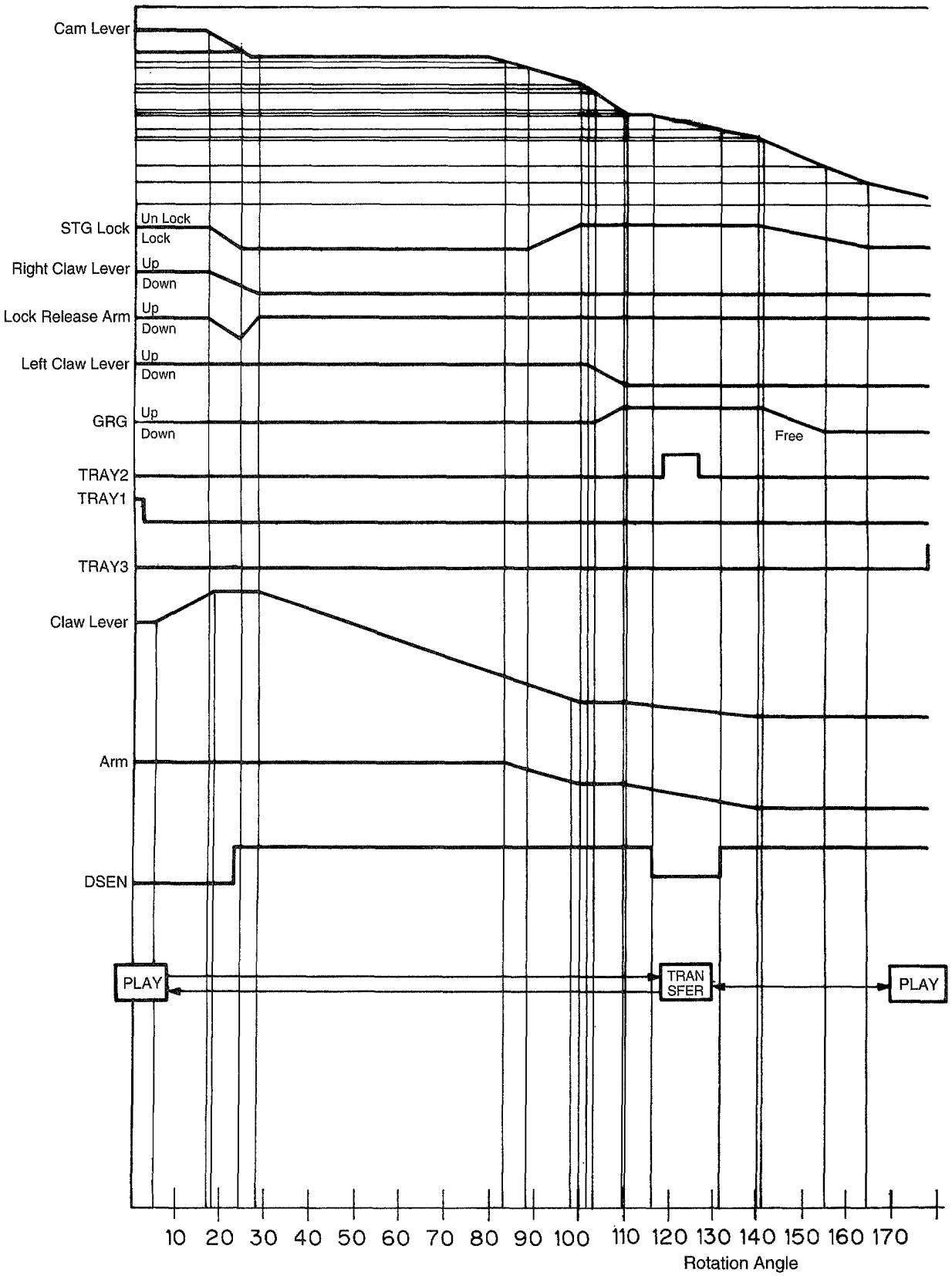


Fig.6



STG Timing Chart

Fig.7

● Loading play

① Initial position

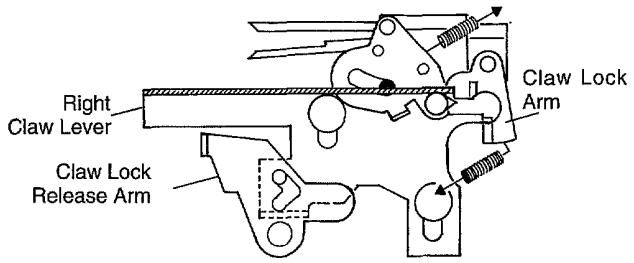


Fig.8

② DISC-gripping position

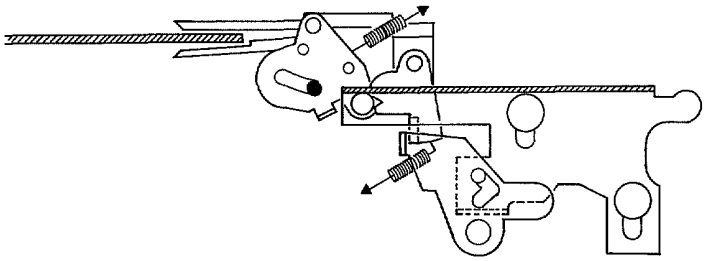


Fig.9

③ DISC gripping

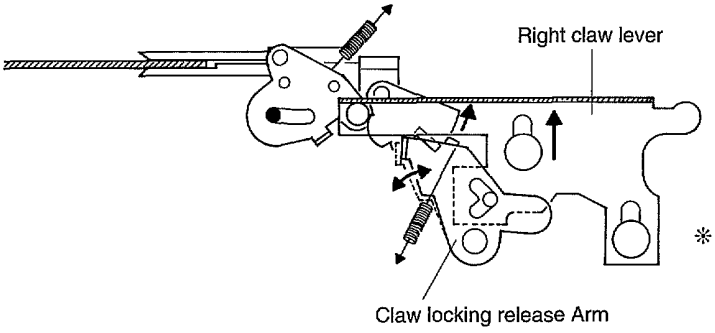


Fig.10

④ Draws to the Play position.

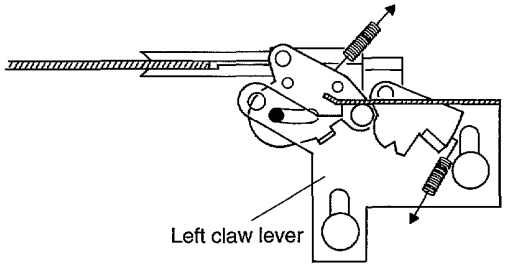


図11

⑤ The claws release the DISC.

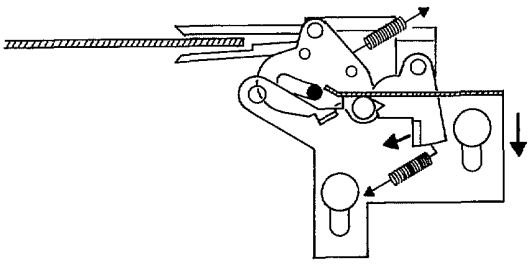


Fig.12

⑥ Retreat further to the rear, with the claws open.

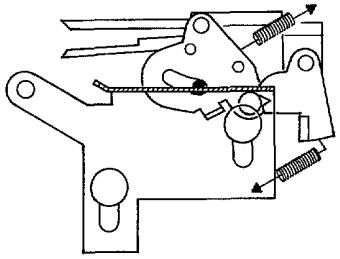


Fig.13

※ Explanatio on operation from steps ④ to ⑤
The left claw lever is lowered, whereupon the claws open and the locking arm engages. (In fact, the lever holds the claws opened.)

※ Relationship between the right claw leber and the claw locking release arm.

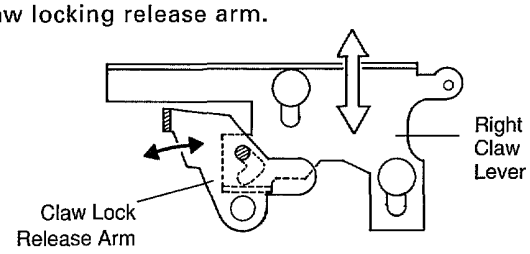


Fig.14

The arm shifts toward the right while the right lever slides downward/upward.
Then, the claw locking arm is released.

● During unloading

⑦ Retreating state

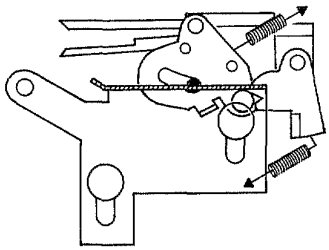


Fig.15

⑧ The DISC is covered with the claws.

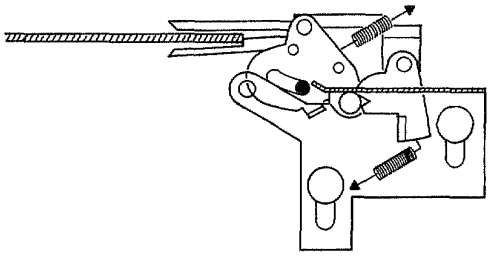


Fig.16

⑨

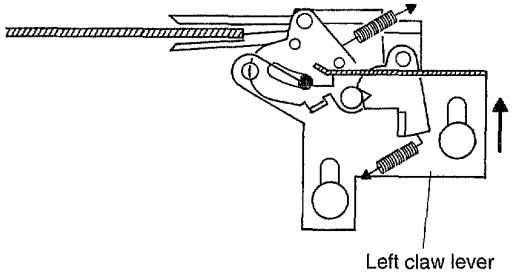


Fig.17

⑩ The DISC is returned to the case.

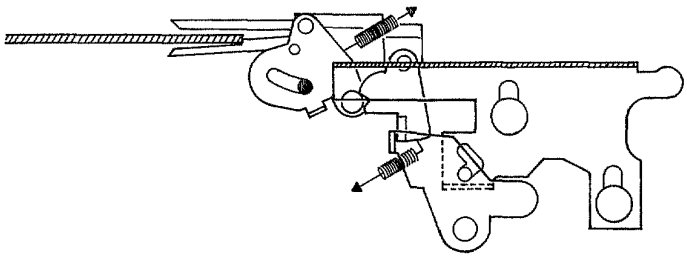


Fig.18

⑪

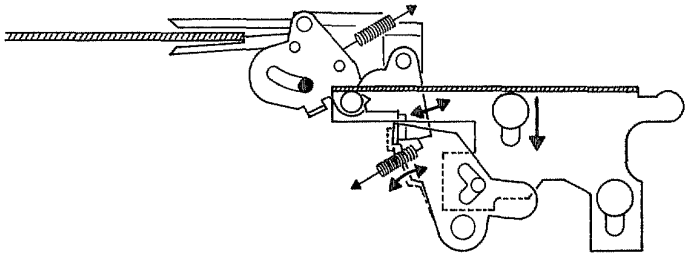


Fig.19

⑫ Returns to the initial position.

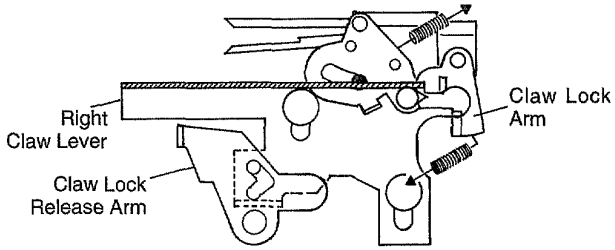


Fig.20

※ Explanation on operation from steps ⑩to ⑪
The claw locking release arm hits the locking arm to close the claws. The right claw lever is lowerd, whereupon the locking arm locks the claws so that they are held open.

Explanation on operation from steps ⑧ to ⑨
Although the left claw lever slides upward, the locking lever has engaged in the operation from steps ④ to ⑤. Therefore, the claws are held open.

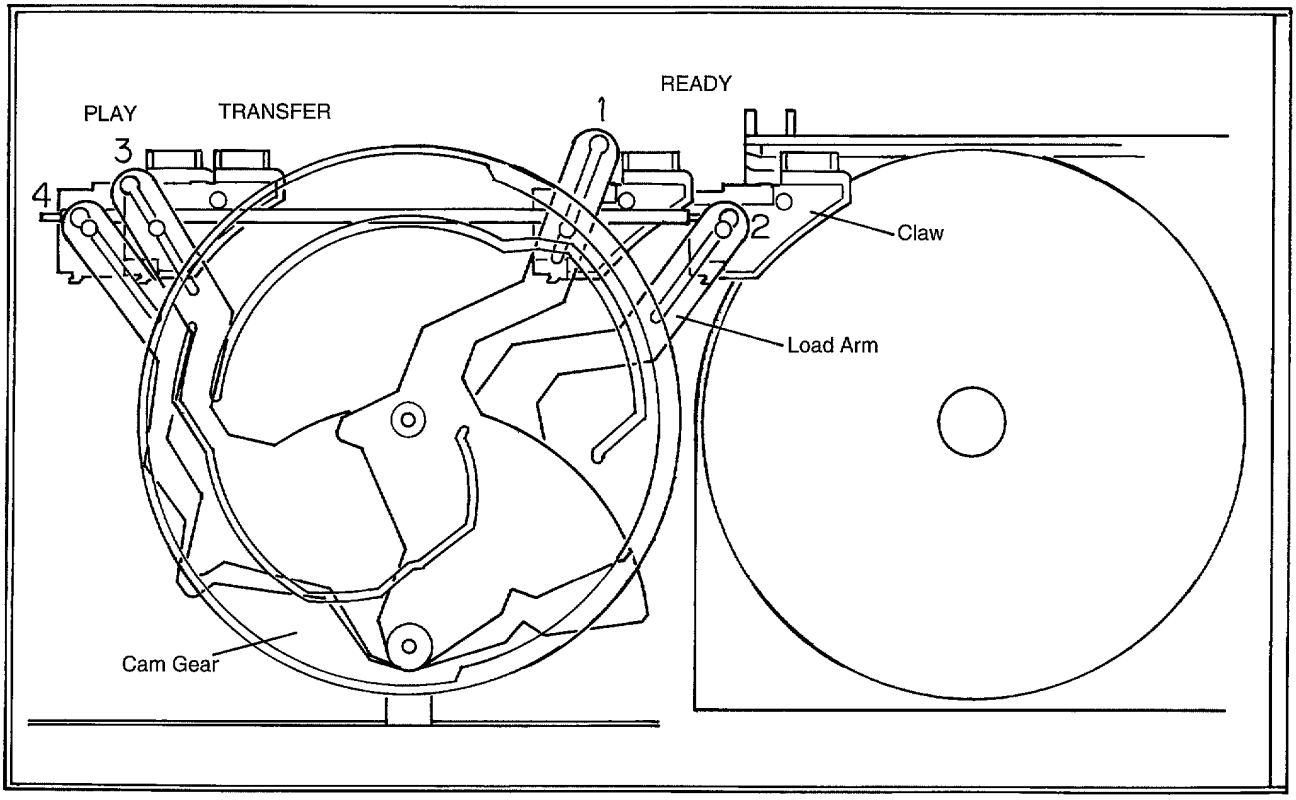


Fig.21

● Loading operation

1. Mode

PLAY ⇄ TRANSFER ⟷ PLAY

Loading has three modes: Ready, Transfer, and Play. The portion between Ready and Transfer modes has hysteresis caused by operations of the DISC seizing claws and thus cannot reverse in mid-operation. The operation must be completed such that each mode is finalized. No such problem exists between Transfer and Play modes.

The main statuses of each mode are summarized in the timing chart shown in Fig. 7. The X axis is the rotation angle of the cam gear.

STG lock: For stage locking, the locking arms located at front/rear and left hit the frame to stop the stage at that height. The front/rear arms are covered with rubber to lock the stage upon hitting the frame. The left arm presses the shaft into the hole provided in the frame.

Left/right claw levers: Operate upward/downward to open/close the claws, as shown in Figs. 8-20.

Lock release arm: Releases the locking arm, while maintaining the claws open.

CRG: The illustration shows the vertical motion of the carriage mechanism. The carriage is released in Play mode, allowing it to move for the portion of vibrationproof stroke.

Arm: Located in the upper portion of the stage mechanism. This arm is to increase the stroke of the loading arm in the direction of playback.

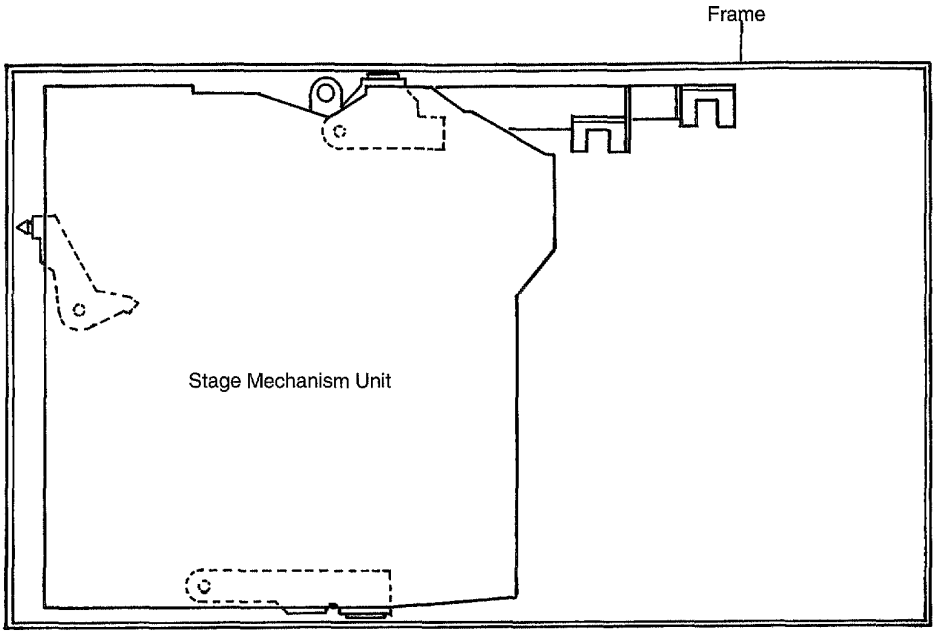


Fig.22

● Coupling the carrying case and the stage

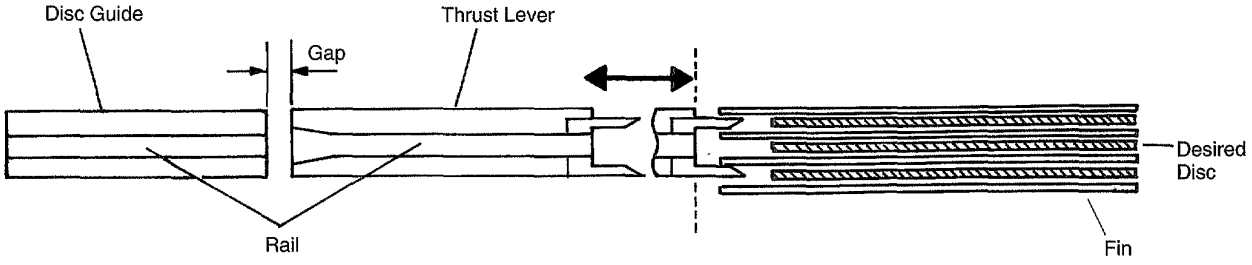


Fig.23

For loading, this mechanism grips the disc and removes it from the carrying case, then carries the disc to the clamper. To stabilize disc transfer, it rides on a rail.
The carrying case has fins at spacing of 3 mm, between which the discs are stored. A rail is provided in the stage so that a disc held in the claws is transferred via the rail. The mechanism to connect these two rails into one single rail only during loading/unloading of discs is called the thrust lever.
The system judges the position of the desired disc through the TSEL signal, then pushes the thrust lever toward the right (Fig. 23).
The top and bottom of the thrust lever enter the upper and lower portions of the fins holding the desired disc. Thus, a single rail is formed that stretches from the carrying case to the stage mechanism. This is performed both at the front and rear of the carrying case. Although the gap between the thrust lever and the DISC guide in the stage will increase, the thrust lever returns to its original position while the disc is on the thrust lever, reducing the gap. The operation is reversed for unloading, such that the thrust lever with a disc on it couples with the carrying case to return the disc. However, the thrust lever only supports the disc. Actual disc transfer is completely performed by the claws. Then, the CRG chassis is lowered and locks. The clamper is locked in the upper portion.

● **Transfer mode**

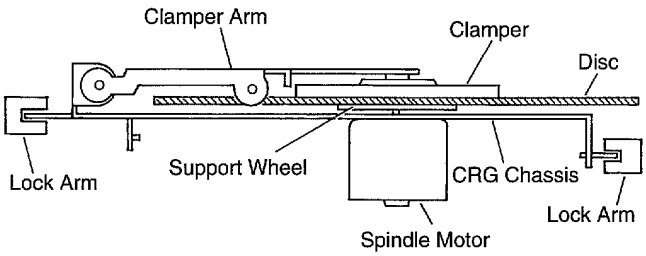


Fig.24

In Transfer mode, the disc is elevated while it is clamped in the stage. Therefore, the stage will not be locked to the frame. However, the clamped disc must be prevented from returning to the carrying case from the stage. The illustration shows the normal state of the clamper. Note that the CRG chassis is locked, which is not the case with conventional mechanisms. In Fig. 21, the claws overlap the disc. This means that there is no vibrationproof stroke in Transfer mode, even though the disc is clamped.

● **Play mode**

In Play mode following Transfer mode, the system unlocks the CRG chassis and locks the stage chassis to the frame, with the claws retreated (see Fig. 21). The CRG chassis is lowered by 5 mm and is released.

● **Locking**

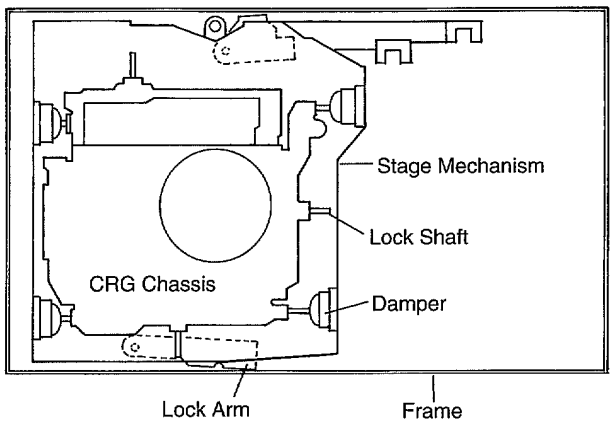


Fig.25

The locking mechanism involves the frame, stage mechanism, and CRG chassis, each performing locking and unlocking.
The stage mechanism is unlocked from the frame on the following occasions:
◎ Elevation (Ready and Transfer modes)
◎ Immediately before applying the thrust lever
The stage mechanism is locked to the frame on the following occasions:
◎ Applying the thrust lever to loading/unloading the disc
◎ Play
The stage mechanism is unlocked from the frame immediately before the thrust lever is applied, to reduce load from the lever through dislocation caused during operation of the lever. Either the stage or carrying case, whichever is easier to shift, follows the thrust lever.

Relationship between the stage and the CRG chassis:
◎ During loading/unloading of the disc: The stage is locked at the lower portion (The clamper arm is locked at the upper portion.)
◎ Transfer mode: The stage is locked at the upper portion (The clamper arm releases the disc.)
◎ Play mode: The stage is not locked.

● Detection of missing discs

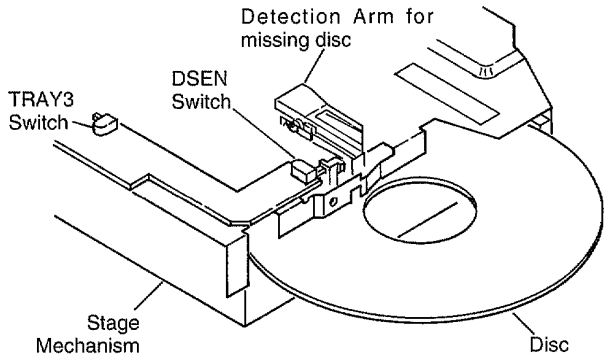


Fig.26

The CX-642 has a detection system to detect whether a disc somehow gets left in the middle of loading/unloading process. The system detects the DSEN switch when the TRAY2 switch is ON (in Transfer mode) by synchronizing with the timing of loading. If the DSEN switch is ON, the arm has not been lowered. The system judges that the disc remains inside the stage. If the TRAY1 switch is ON (in Ready mode), the system also checks the DSEN switch to judge whether elevation can be performed or not.

● Extra tray

1. Detecting a disc by interlocking with the door
If the door is open, the cover click arm rotates the arm with the DISC detection shaft forward through the operation of the detection interlocked arm, etc. If the door is closed, the detection shaft rotates toward the rear. If there is a disc present, the switch will not be set to ON. The system also detects whether or not the door is closed. The system can judge whether or not there is a disc present only when the door is closed.
2. Opening/closing of the door
For car models designed with lower height for the audio system, the door of the extra tray has four clicks. The system stops at the 1st click when the lock is released. Then, the system stops at the 2nd and 3rd clicks. The door fully opens at the 4th click, opening at an angle of 60 degrees. The door is kept open with the click lever holding the hollow part.
3. Door locking arm
If the stage mechanism is in the position of the extra tray, the door locking arm firmly holds the door locking lever to prevent the door from opening. Thus, the user cannot insert/eject the disc in the extra tray.

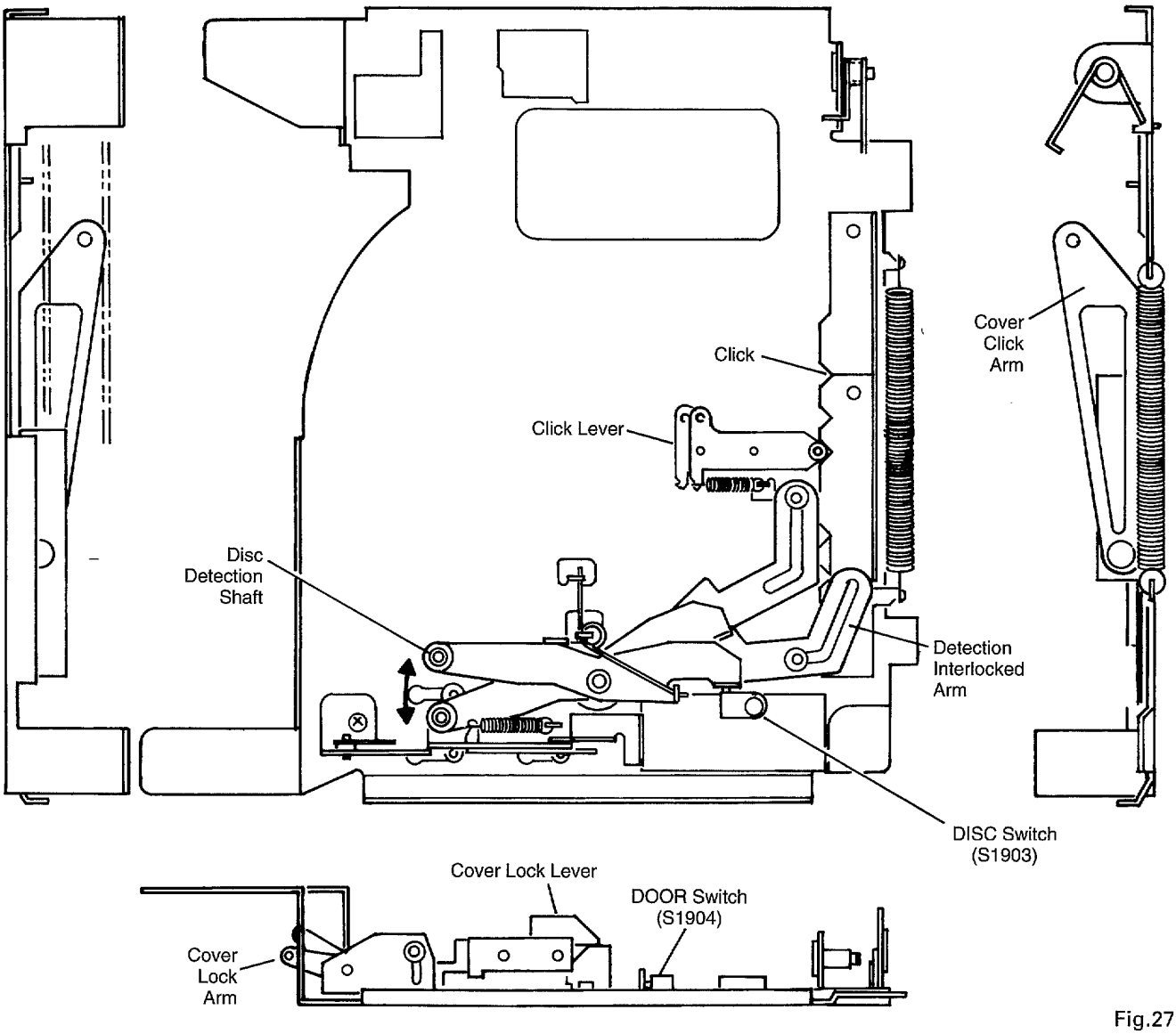

Cover
Click
Arm
Click
Click Lever
Disc
Detection
Shaft
Detection
Interlocked
Arm
DISC Switch
(S1903)
Cover Lock Lever
DOOR Switch
(S1904)
Cover
Lock
Arm

Fig.27

2. REMOVING THE EXTERNAL PARTS

● Plus One

1. Remove the two plastic sliders.(Fig.28)
2. Remove the spring while removing the cover unit.(Fig.28)
3. Remove the six screws to remove the case.(Fig.29)

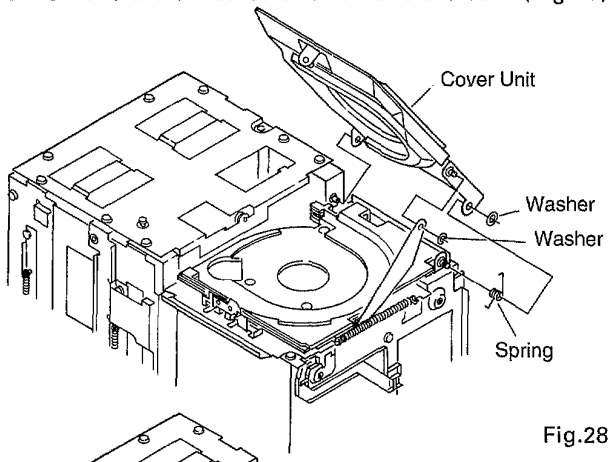


Fig.28

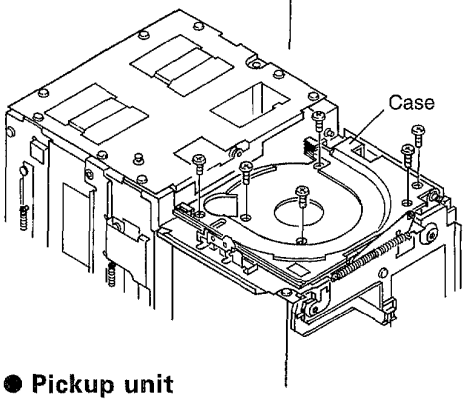


Fig.29

● Pickup unit

1. In Test mode, move the stage mechanism to the top position. (Enter Test mode, then input data for the 50th disc so that the stage mechanism stops at the top position.)
2. Turn the CD mechanism over.
3. Remove the 9 screws to remove the frame.

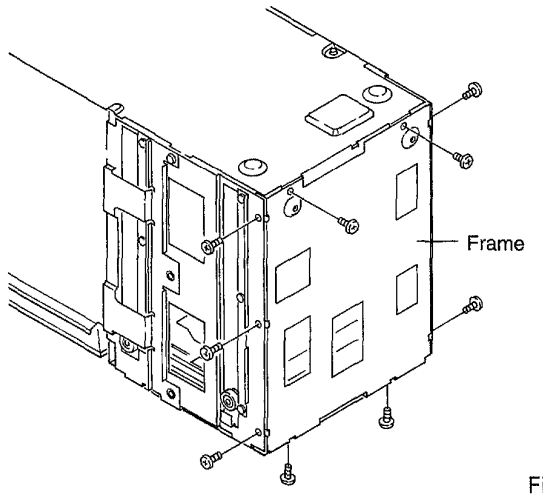


Fig.30

4. Remove the four screws to remove the bracket unit. (For assembly, install the lever to the point indicated in the illustration.)

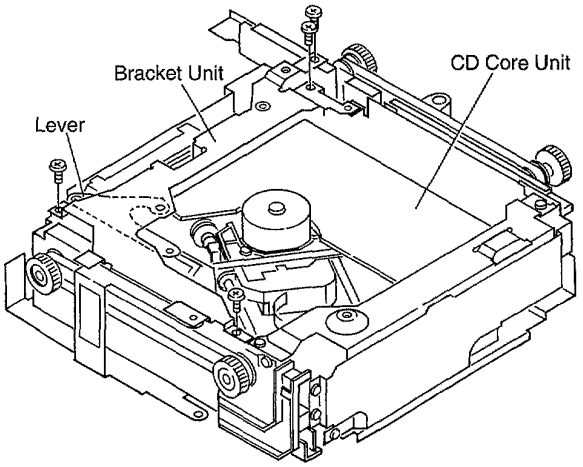


Fig.31

5. Insert the short pin into the flexible substrate of CN101.

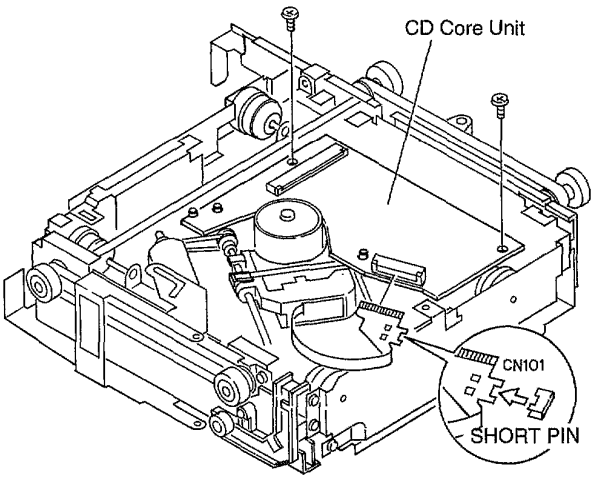


Fig.32

6. Remove the two screws to remove the CD core unit.(Fig.32)
7. Remove the tensor screw that presses against the end of the feeding screw.(Fig.33)
8. Remove the two screws to remove the rack.(Fig.33)
9. Remove the two screw to remove the holder.(Fig.33)
10. Remove the belt. Remove the Pickup unit together with the feeding screw.(Fig.33)

11. Lift the tab and pull out the feeding screw. Be careful not to lose the bearings at both ends of the feeding screw.

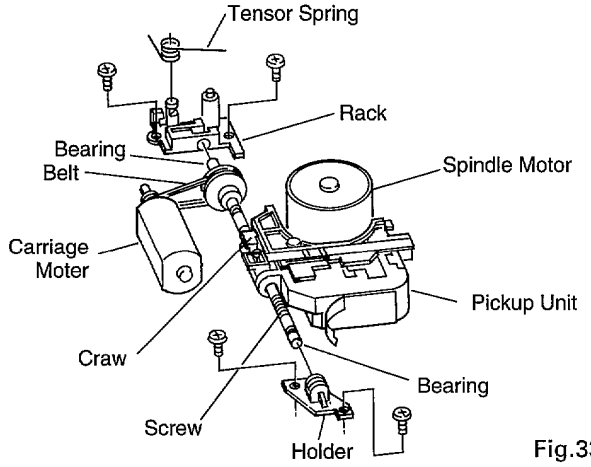


Fig.33

● Replacing the thread

1. Remove the screw to remove the cover.
2. Remove the two screws to remove the thread.

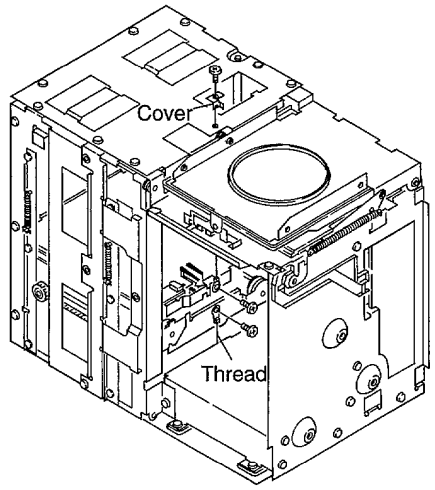


Fig.34

3. Remove the four springs (two springs on the opposite side).
4. Remove the eight screws.
5. Remove the brackets.
6. Remove the flexible substrate.

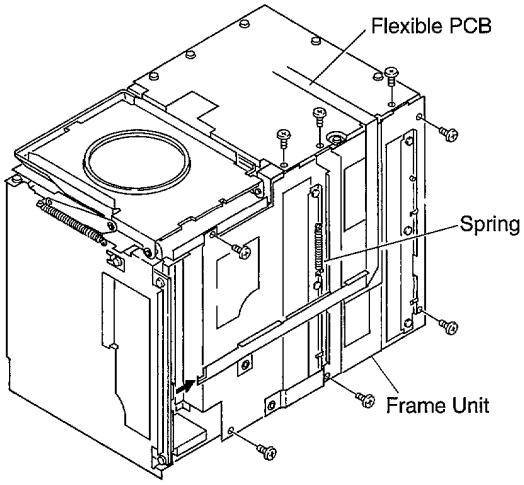


Fig.35

7. Remove the shaft to remove the stage mechanism.
8. Remove the flexible substrate.

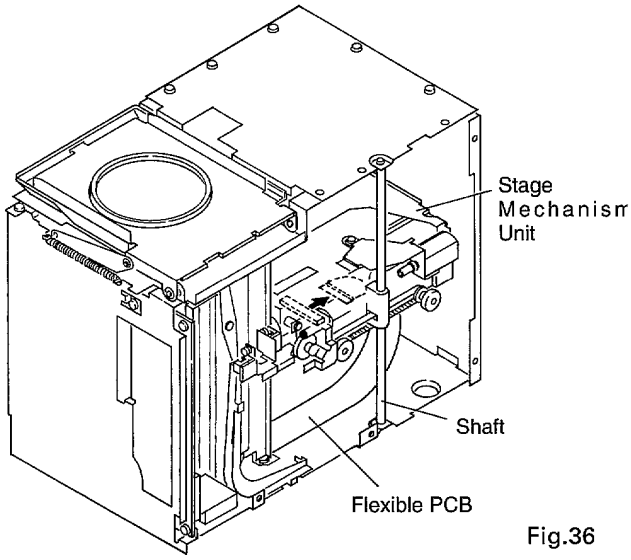


Fig.36

9. Remove the twisted thread of the pulley as shown in the illustration.
10. Remove the eight screws.

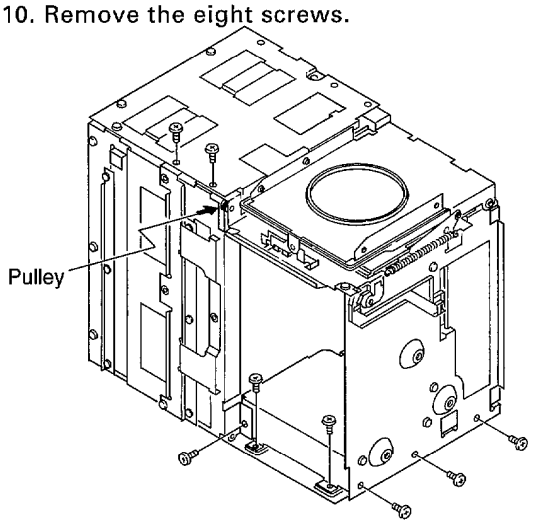


Fig.37

11. Remove the flexible substrate.
12. Remove the two screws.
13. Remove the case receiver. Attention must be

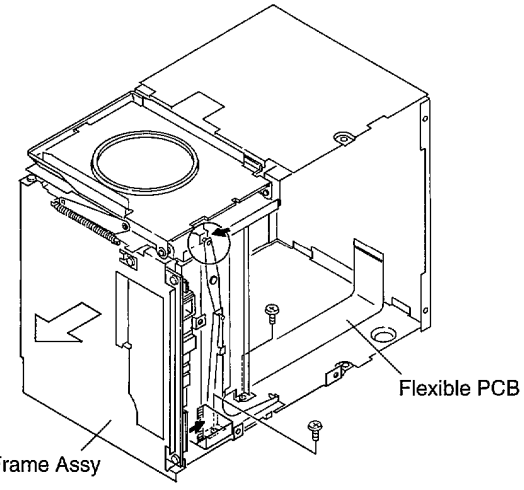


Fig.38

paid to the points indicated with an arrow, as they tend to come off easily during assembly.
14. Remove the four screws and the bracket.
15. Replace the thread.

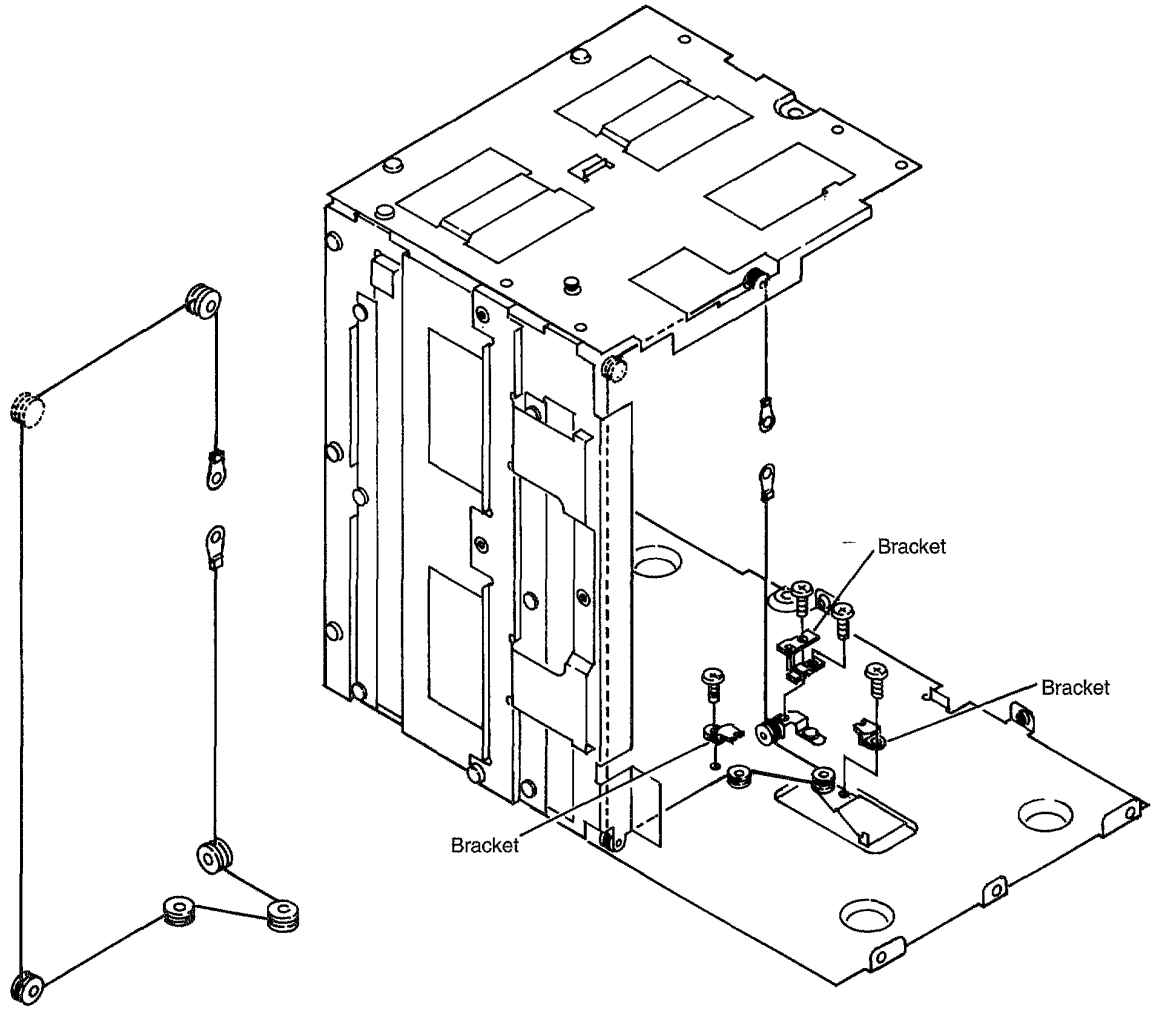


Fig.39

3. CIRCUIT DESCRIPTION

3.1 POWER CONFIGURATION

The power supply of the system consists of VD (8.6 V) and 5 VA (5 V).

VD : Main power generated in the system unit.

5 VA : Power supply for IC101, IC201, and the pick-up unit. Power is generated by the regulator IC (IC701) from VD, and output when VD is turned ON.

3.2 OPERATION OF THE MECHANISM

- Elevation detection
  Detection is made when a photosensor (D401) passes the slit in the carrying case, whereby TSEL is set to "L."
- Disc detection
  When the carrying case is loaded, the disc-detection arm is pressed by the disc. The system detects whether a disc is set or not when a photosensor (D402) passes the disc-detection arm. The system judges that a disc is set if the arm blocks the photosensor, whereby DISC is set to "H."

1) Operation of disc detection

- After the carrying case is loaded, detection of the first disc is made when resetting of the mechanism is completed. After that, detection of the second and subsequent discs will be made while the stage is being lifted (elevation UP).
- After detecting "H," the system detects "L" to change the count of TSEL to the actual count plus one.
- The timing of disc detection is made after detecting TSEL = "L."
- Since 8-cm CDs use an adapter, detection for 8-/12-cm CDs is not made.
- The system judges that TSEL = "L" when VL is 1.0 V or less, and TSEL = "H" when VH is 3.9 V or higher.

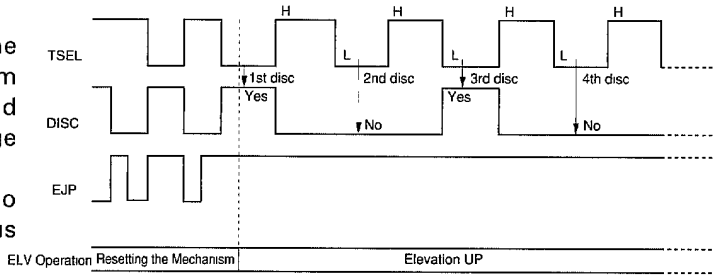


Fig.40

2) Ejecting the carrying case (C/C)

- The system detects EJP = "L."

  ↓

  After detecting TSEL = "L," the system detects "H" and then confirms "L," and ejects the C/C with the brake.

  ↓

  After confirming MAG = "L," the system lifts the stage (elevation UP) until EJP is set to "H."

  ↓

  Eject completed

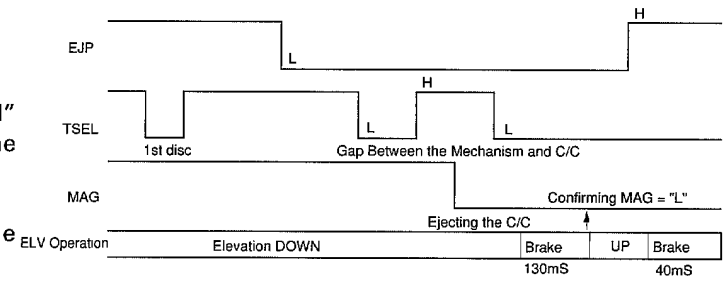


Fig.41

3) Changing discs (in the direction of elevation UP) Example : 1→2

Notes :

- Counting of TSEL is made in the same manner as mentioned above.
- After finalizing the operation for the destination disc, the system detects whether a disc is set or not.

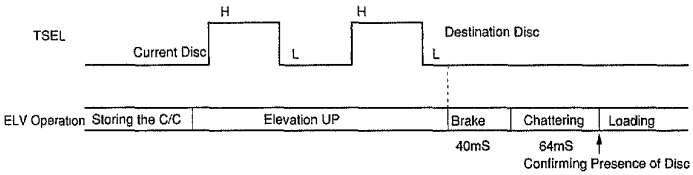
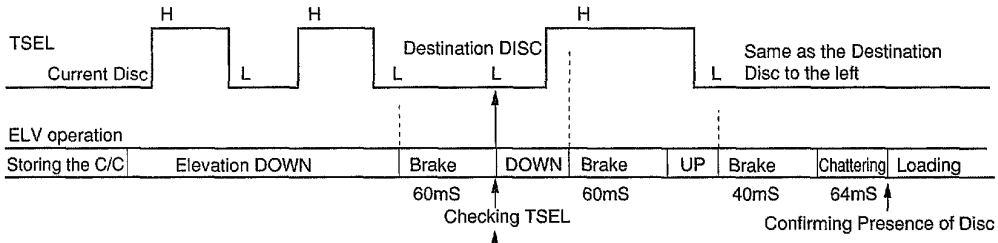


Fig.42

4) Changing discs (in the direction of elevation DOWN)

Example : 2→1



Note : Subsequent processing depends on the results of TSEL checking after operating the brake for 60 ms and detecting the destination disc.

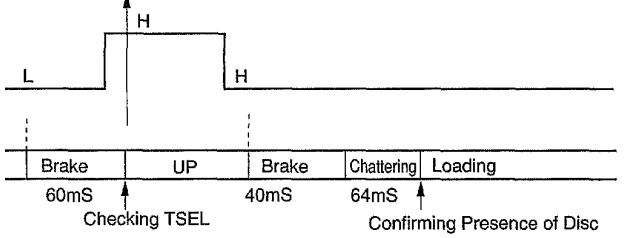


Fig.43

5) Loading a disc and detection of a forgotten disc

- Loading and ejection of discs are controlled by ON/OFF of the switches of TRAY 1, 2 and 3.
- When TRAY 2 is ON ("L"), the system enters Disc Transfer mode (+1 load/eject) and is set to half clamping.
- After detecting TRAY 2 = "L," the system checks DSEN to be "H" for OK and "L" for NG.

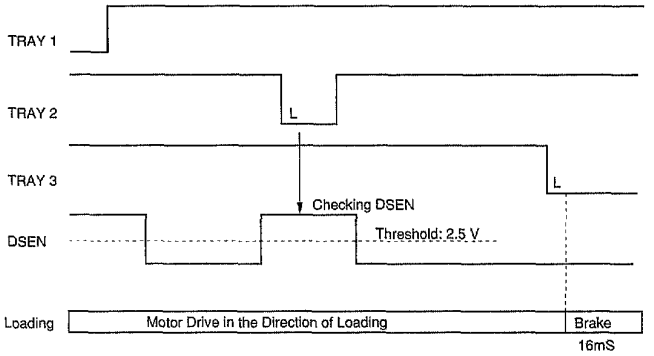


Fig.44

6) Ejecting a disc (C/C storage) and detection of a forgotten disc

- After detecting TRAY 1 = "L," the system checks DSEN to be "H" for OK and "L" for NG.

7) Input for the motor driver and operation of the motor are as follows:

ELV Motor	Load Motor	I1	I2	I4
Brake	Load	H	H	L
Stand-by	Eject	L	L	H
DOWN	Brake	H	L	H
UP	Stand-by	L	H	L
Brake	Brake	H	H	H
Stand-by	Stand-by	L	L	L

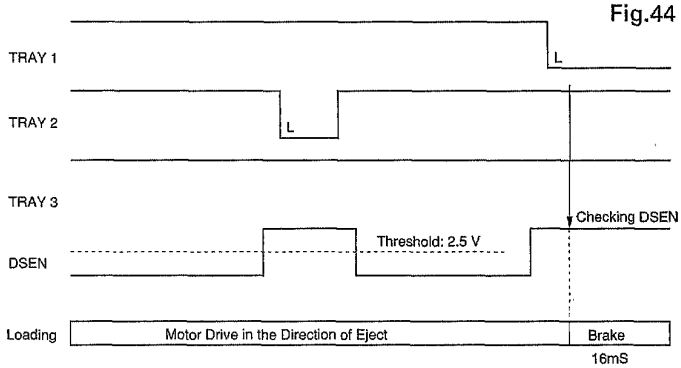


Fig.45

3.3 PRE-AMP SECTION (UPC2572GS: IC101)

This section processes the pickup output signals to create the signals for the servo, demodulator & control.

The pickup output signals are I-V converted by the pre-amp with built in photo-detector in the pickup, and added by the RF amp (IC101) to obtain the RF, FE, TE, TE zero cross, and other signals.

The main component is the UPC2572GS and each section is explained below. Because this system has a single power supply (+5V), the reference voltage for this IC, the PU and the servo circuit is the voltage REFO (+2.5V). The REFO signal is obtained by buffering REFOUT from the servo LSI (IC201: UPD63702GF) and is available from Pin 19 of IC101. All measurements should be done using this REFO as reference.

Note: During measurement, do not short REFO and GND.

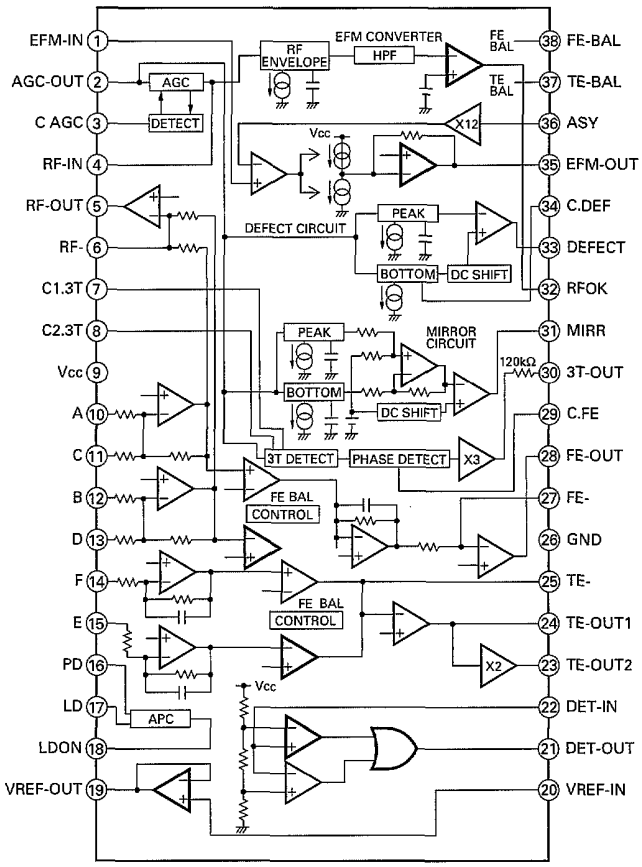


Fig.46 : UPC2572GS BLOCK DIAGRAM

1) APC Circuit (Automatic Power Control)

When the laser diode is driven with constant current, the optical output has large negative temperature characteristics. So the current must be controlled to hold the output constant with the monitor diode. The circuit that carries out this function is the APC circuit. The LD current is obtained by measuring the voltage between LD1 and ground and the value of this current is about 35mA.

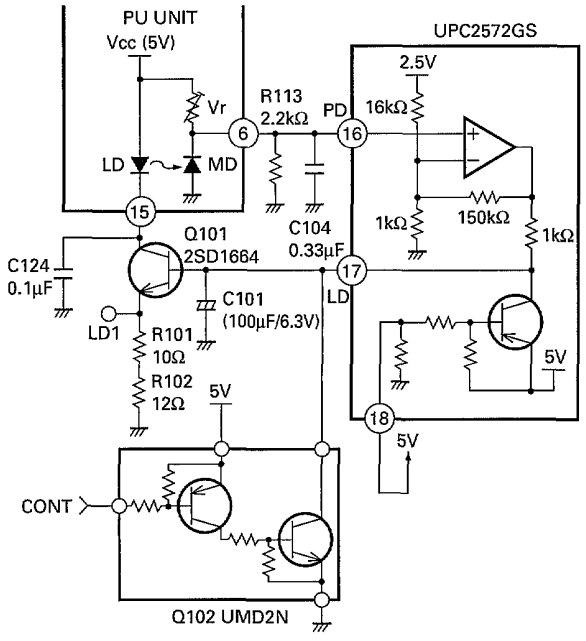


Fig.47: APC CIRCUIT

2) RF Amp, RF AGC Amp

The photo-detector outputs (A+C) and (B+D) are added, amplified, and equalized in IC101 and output to the RFI pin. (The eye pattern can be checked at this pin.)

The RFI voltage low-frequency component is:

RFI = (A+B+C+D) × 3.22

R111 is the offset resistor for holding the RFI signal in the pre-amp's output range. The RFI signal is AC coupled and input to Pin 4 (RFIN pin).

This IC contains an RF AGC circuit, which holds the RFO output at Pin 2 at a fixed level (1.2 ± 0.2Vp-p). This RFO signal is used in the EFM, DFCT, and MIRR circuits.

3) EFM Circuit

This circuit, "squares" up the analog RF signal into a digital EFM signal. In order to ensure minimum errors it is necessary to use a feedback circuit to match the DC level of the threshold to the center of the RF waveform.

This circuit uses the fact that the EFM signal should have no DC component. By feeding back the EFM signal's DC level the threshold level changes until the DC level is zero and the threshold, by definition, is at the exact center of the RFO waveform. The filtering in the feedback has been adjusted to ensure minimum error. The EFM signal is output from Pin 35. The signal is a 2.5Vp-p amplitude signal centering on REFO.

4) DFCT (Defect) Circuit

The DFCT circuit detects defects on the disc surface, and outputs a "H" signal from Pin 33.

If there is dirt on the disc, drop outs may appear. The DFCT signal output is input to the servo LSI HOLD pin and the focus and tracking servo drives are held while the DFCT output is "H" in order to improve playability.

5) RFOK Circuit

This circuit produces the signal indicating the focus close state during play and the timing for closing the focus servo. This signal is output from Pin 32. This RFOK signal output is input to the servo LSI RFOK pin and the focus close command is issued by the servo LSI. This signal is high during play when the focus is closed.

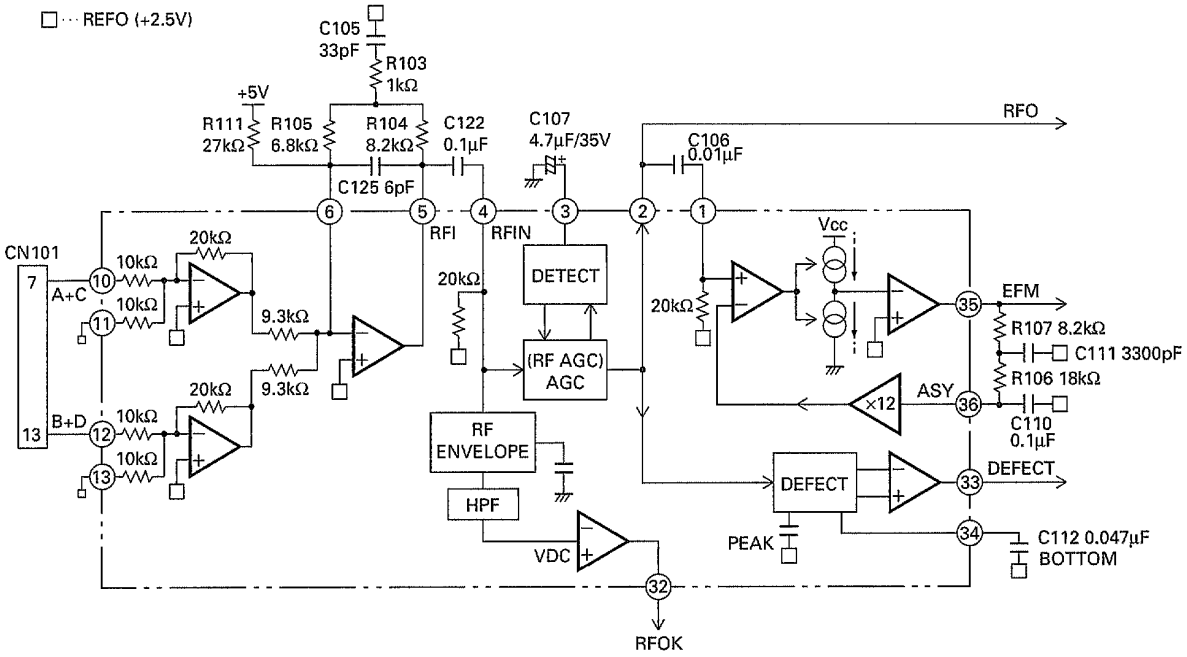


Fig.48 : RF AMP, RF AGC, EFM, DFCT, RFOK CIRCUIT

6) Focus Error Amp

The photo-detector outputs (A+C) and (B+D) are passed through a differential amp, and an error amp and (A+C-B-D) is output from Pin 28 as the FE signal.
The FEY voltage low-frequency component is:

$$FEY = (A+C-B-D) \times \frac{20k\Omega}{10k\Omega} \times \frac{90k\Omega}{68.8k\Omega} \times \frac{R108}{17.2k\Omega}$$

: (PU FE level × 5.02)

An S curve of about 1.6Vp-p is obtained with REFO as the reference. The final-stage amp cutoff frequency is 12.4kHz.

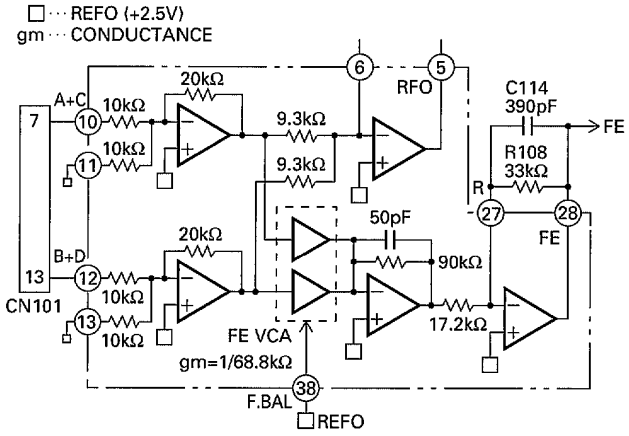


Fig.49 : FOCUS ERROR AMPLIFIER

7) Tracking Error Amp

The photo-detector E and F outputs are passed through a differential amp and an error amp and (E-F) is output from Pin 24 as the TE signal.
The TEY voltage low-frequency component is:

$$TEY = (E-F) \times \frac{63k\Omega}{(31k\Omega+16k\Omega)} \times \frac{R109}{17k\Omega}$$

: (PU TE output level × 5.36)

The TE waveform of about 1.5Vp-p with REFO as the reference is obtained as the TE output (Pin 24). The final-stage amp cutoff frequency is 19.5kHz.

8) Tracking Zero Crossing Amp

The tracking zero crossing signal (below, TEC signal) is the TE waveform (Pin 24 voltage) amplified four times and is used to find the zero crossing points of the tracking error with the UPD63702GF servo LSI. This zero crossing point is found for the following two reasons.

(1) To count tracks for carriage moves and track jumps
(2) To detect the direction in which the lens is moving for tracking closing (This is used in the tracking brake circuit, described Page 20 b).)

The TEC signal frequency range is 500Hz - 19.5kHz.

TEC voltage = TE level × 4

In other words, the TEC signal level is calculated at 6Vp-p. This level exceeds the op-amp's output range and the signal is clipped, but this can be ignored because this signal is used by the servo LSI only at the zero crossing point.

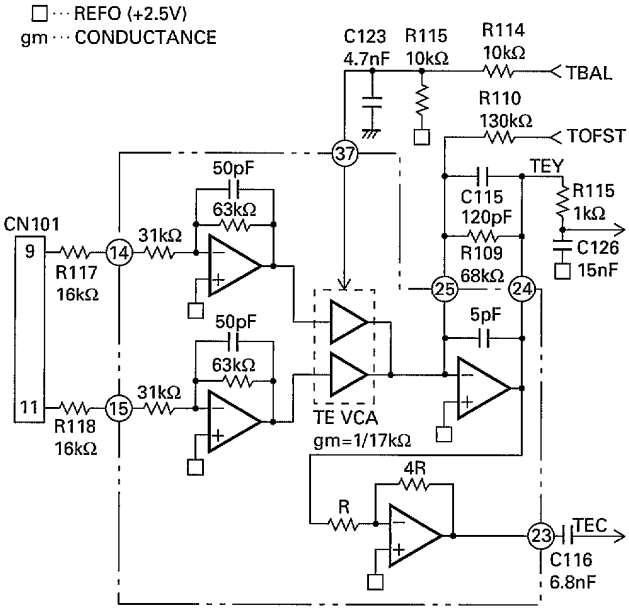


Fig.50 : TRACKING ERROR AMPLIFIER & TRACKING ZERO CROSSING AMPLIFIER

9) MIRR (Mirror) Circuit

The MIRR signal shows the on track and off track data and is output from Pin 31.

When the laser beam is

On track: MIRR = "L"

Off track: MIRR = "H"

This signal is used in the brake circuit, described Page 24.

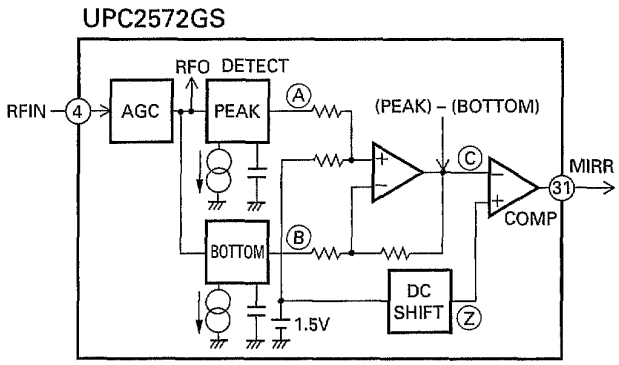


Fig.51 : MIRR CIRCUIT

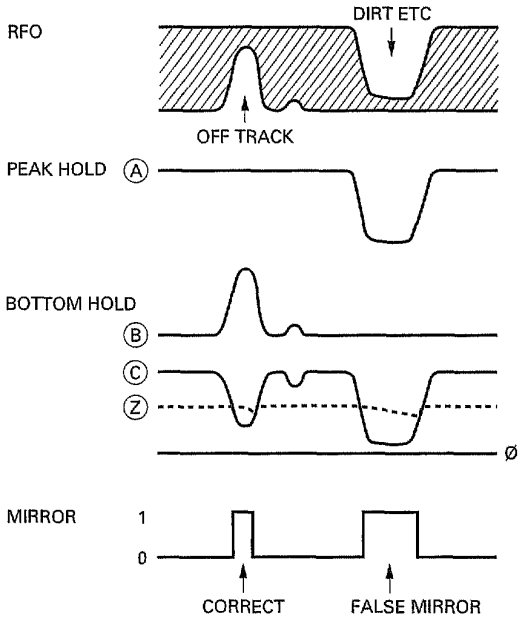


Fig.52 : MIRR CIRCUIT & SIGNAL DIAGRAM

10) 3TOUT Circuit

This circuit detects variations of the RF signal when an external interference is input into the focus servo loop and outputs the phase difference between the FE signal and the RF level variation signal from Pin 30. The signal has been passed through a low-pass filter (fc = 40Hz). This signal is used for the FE bias automatic adjustment, described Page 27.

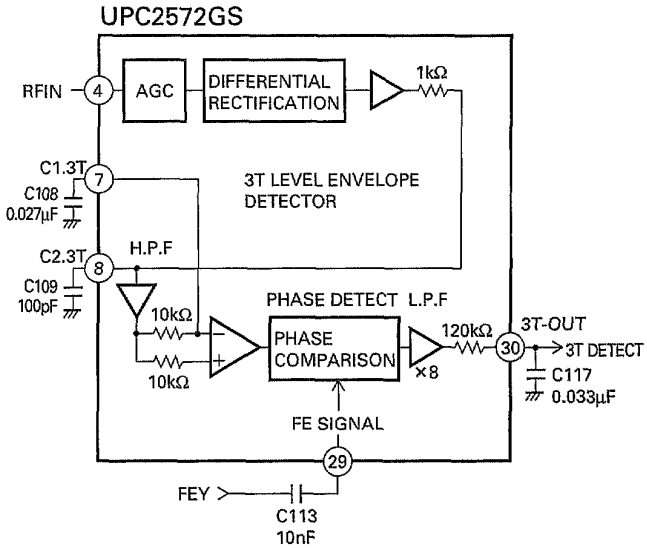


Fig.53 : 3T OUT CIRCUIT

3.4 SERVO SECTION (UPD63702GF: IC201)

This section can be divided into two parts.
One is the servo processing section, which handles such servo controls as error signal equalizing, in focus, track jump, and carriage move. The other is the signal processing section, which handles data decoding, error correction, and interpolation processing.
This IC converts the FE and TE signals from analog to digital and outputs the focus, tracking, and carriage drive signals via the servo block. Also, the EFM signal from the pre-amp is decoded in the signal processing section and finally output as audio signals after D/A conversion. (This IC has a built in audio digital-analog converter.) The decoding process also creates the spindle servo error signals, which is fed to the spindle servo block to create the spindle drive signal.
The focus, tracking, carriage, and spindle drive signals are then amplified by IC301, XLA6997FM and fed to their respective actuators and motors.

1) Focus Servo System

The main focus servo equalizer is in the UPD63702GF. Figure 54 is the focus servo block diagram.
In the focus servo system, the lens must be brought within the in-focus range for focus closing. Therefore, the lens is raised and lowered according to the triangular focus search voltage to find the focus point. During this time the spindle motor is kicked and kept rotating at a set speed.
The servo LSI monitors the FE signal and the RFOK signal and automatically carries out the focus close operation at the appropriate point.
Focus closing is carried out when the following four conditions are all met.

(1) The lens is moving from far to near toward the disc surface.
(2) RFOK = H
(3) The FZD signal (within the IC) is latched at high.
(4) FE = 0 (REFO reference)

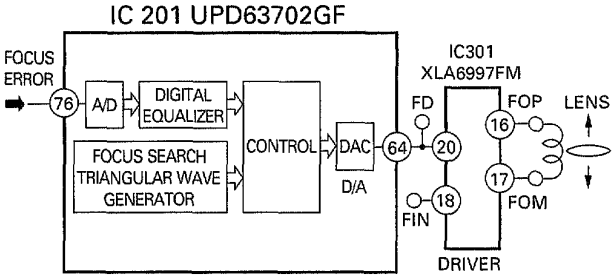


Fig.54 : FOCUS SERVO BLOCK DIAGRAM

When the above conditions are all met and the focus is closed, the XSO signal is shifted from high to low, then 40ms later, the microcomputer begins to monitor the RFOK signal that is passed through the low pass filter.
When the RFOK signal is judged to be low, the microcomputer carries out various actions such as protection.
Figure 55 shows the series of operations for focus closing (for the case where focus cannot be closed.) Also, in focus-mode-selection during test mode when the display is 01, if the focus close button is pressed, the S curve, search voltage, and actual lens movements can be checked.

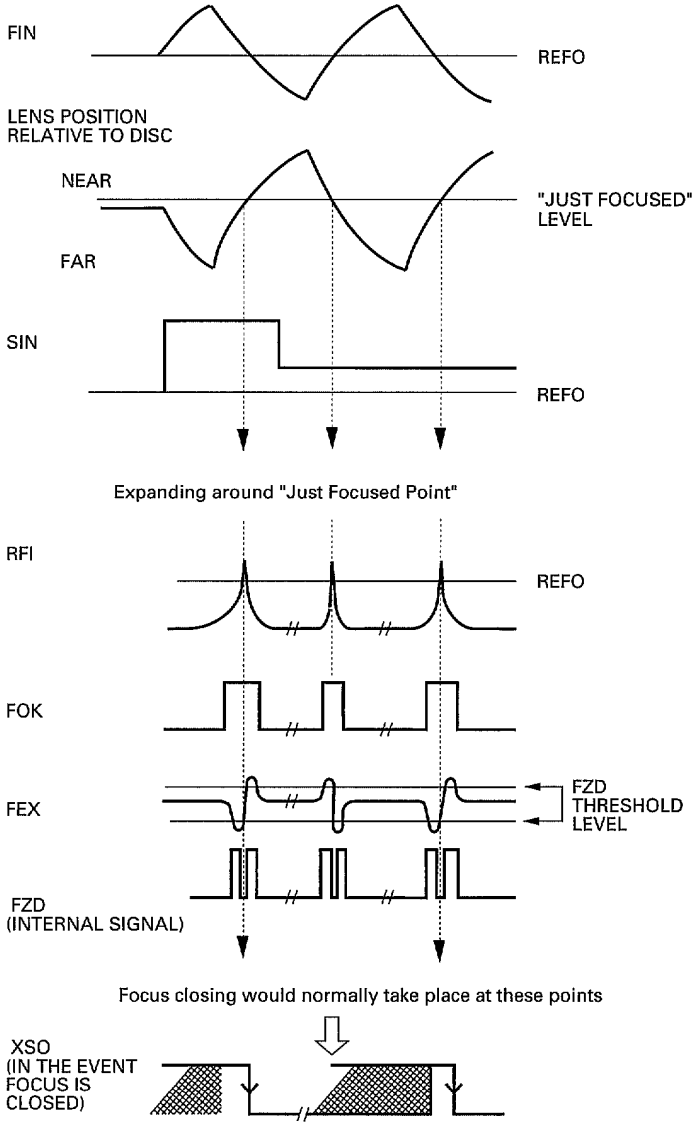


Fig.55: FOCUS CLOSING SEQUENCE

2) Tracking Servo System

The main tracking servo equalizer is in the UPD63702GF. Figure 56 is the tracking servo block diagram.

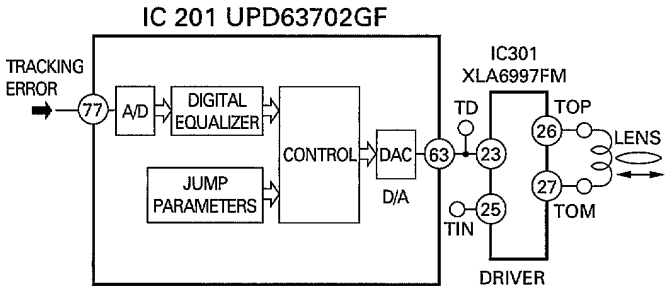


Fig.56 : TRACKING SERVO BLOCK DIAGRAM

a) Track Jump

When the LSI receives the track jump command from the microcomputer, the track jump is carried out automatically by the auto sequence function within the LSI. This system has six types of track jumps used for searches: 1, 4, 10, 32, 32 × 2, and 32 × 3. In test mode, in addition to these jumps, CRG moves can be executed and checked by mode selection. For track jumps, the microcomputer sets half of the total number of jumps (2 tracks for a 4 track jump) and counts the set number of tracks using the TEC signals. From the point when it has counted the set number of tracks, it outputs the brake pulse for a fixed period of time (set by the microcomputer) to stop the lens. In this way, it can close the tracking and continue normal play.

To improve the servo loop re-closing performance just after track jump, the brake circuit comes on for 60ms after the end of the brake pulse and the tracking servo gain is increased.

Fast forward and reverse operations in normal mode are realized by executing consecutive single track jumps. The speed is about 10 times as high as in normal play.

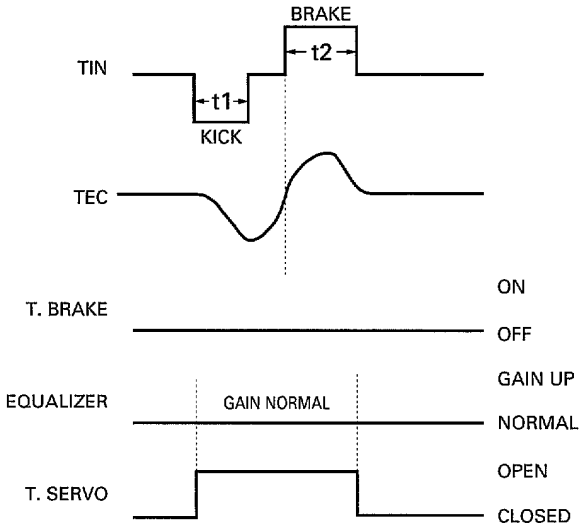


Fig.57 : SINGLE TRACK JUMP

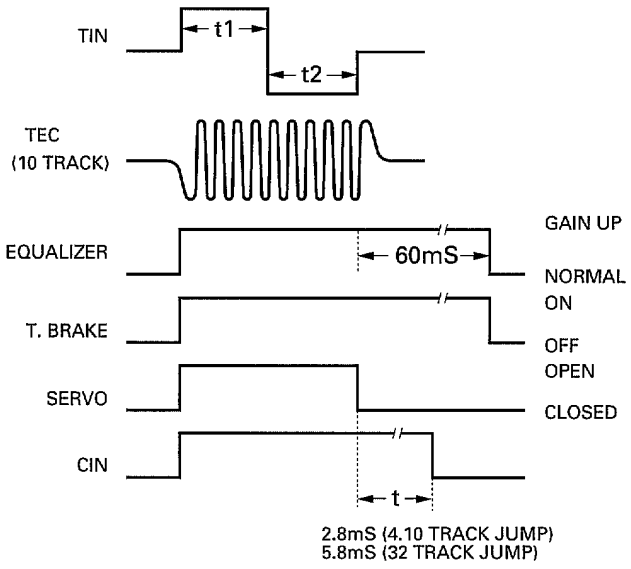
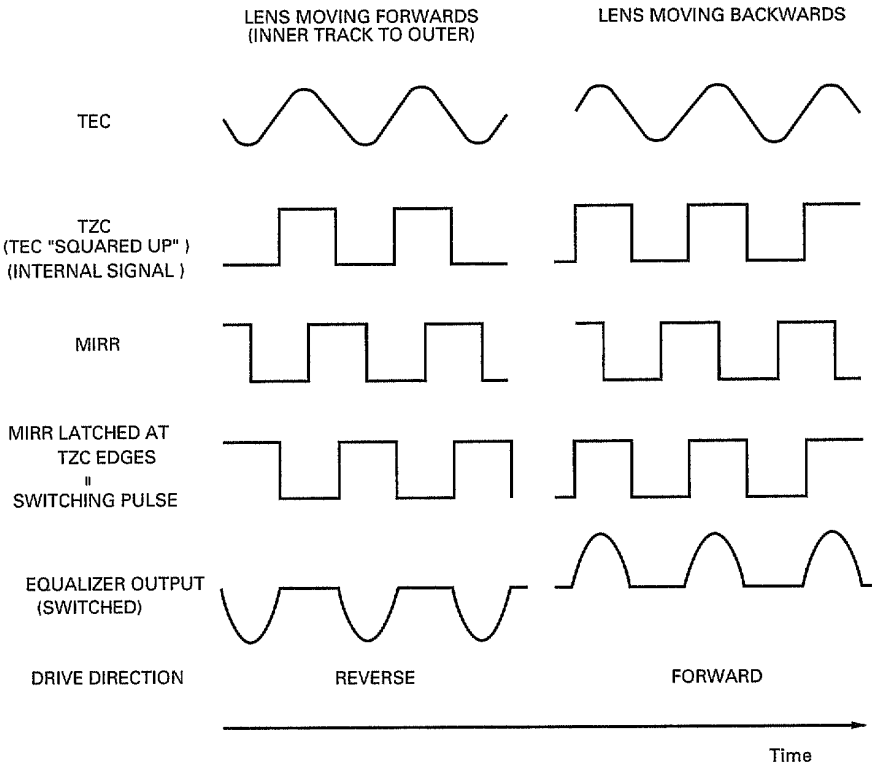


Fig.58 : MULTI-TRACK JUMP

b) Brake Circuit
This relies on determining which direction the lens is moving and only outputting the portion of the drive waveform which acts to oppose this motion. Direction of motion is deduced from TEC and the MIRR signal and knowledge of their phase relation.



Note: Equalizer output assumed to hava same phase as TEC.

Fig.59 : TRACKING BRAKE CIRCUIT

3) Carriage Servo System

The carriage servo supplies the tracking equalizer's low-frequency component (lens position information) output to the carriage equalizer and after applying a fixed amount of gain, outputs the drive signal from the servo LSI. This signal is applied to the carriage motor through the driver IC.

When the lens offset reaches a certain level during play, the entire PU must be moved in the forward direction. Therefore, the equalizer gain is adjusted to output a voltage higher than the carriage motor starting voltage. In actual operations, a certain threshold level is set for the equalizer output within the servo LSI and the drive voltage is output from the servo LSI only when the equalizer output level exceeds that threshold level. This reduces power consumption. Also, due to disc eccentricity and other factors, the equalizer output voltage may cross the threshold level a number of times before the entire PU starts to move. In this case, the drive voltage waveform, (which is applied) from the LSI, becomes pulsative.

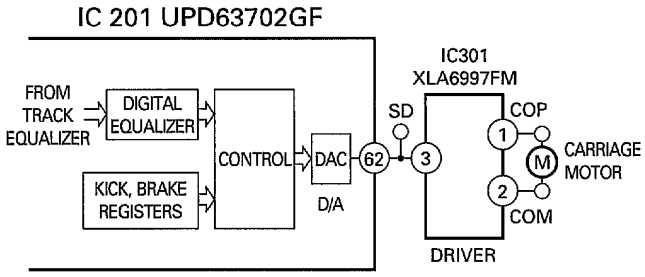


Fig.60 : CARRIAGE SERVO CIRCUIT

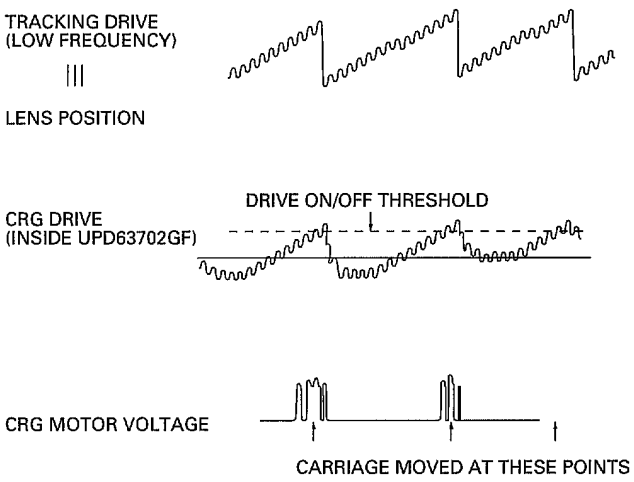


Fig.61 : CARRIAGE WAVEFORM

4) Spindle Servo System

The spindle servo has the following modes.

(1) Kick: The mode used for disc rotation acceleration during setup

(2) Offset:
a) Used during setup from the end of kick until the AGC end
b) Used during play when the focus is unlocked until it is recovered
Both of these are for holding the disc rotation rate near the normal rotation rate.

(3) Adaptive servo: CLV servo mode for normal operation
In the EFM demodulation block, the frame sync signal and internal frame counter output signal are sampled each WFCK/16 and a signal is produced indicating whether or not they match. Only after this signal is in non-match mode eight consecutive times, is the system treated as out of sync, at other times it is treated as in sync. In this adaptive servo mode, a servo mode for pulling the system into sync is automatically selected when the system is out of sync and the regular servo is automatically selected when the system is in sync.

(4) Brake: The mode for stopping the spindle motor rotation
The brake voltage is output by the microcomputer from the servo LSI. At this time, the EFM wave form is monitored within the LSI and if the longest EFM pattern exceeds a certain interval (when the rotation is slow enough), a flag is registered within the LSI and the microcomputer switches the brake voltage off. If the flag is not registered within a certain period of time, the microcomputer switches from brake mode to stop mode which lasts for a fixed period of time. In this case, ejection of the disc can only occur after this period of time.

(5) Stop: The mode used during power on and ejection
At this time, the voltage across the spindle motor is 0V.

(6) Rough servo: The mode used for carriage feed (carriage move during a long search)
The linear speed is calculated from the EFM wave form and a high level or low level is input to the spindle equalizer. In test mode, this mode is also used for the grating check.

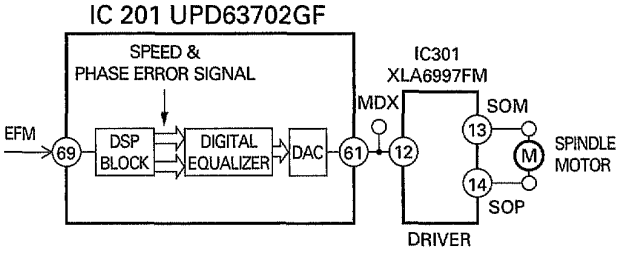


Fig.62 : SPINDLE SERVO BLOCK DIAGRAM

3.5 AUTOMATIC ADJUSTMENT FUNCTIONS

This system uses a pre-amp (UPD2572GS) and servo LSI (UPD63702GF) to automate all circuit adjustment. All adjustments are carried out automatically each time a disc is inserted or the CD mode is selected with the source key. Here is how each automatic adjustment works.

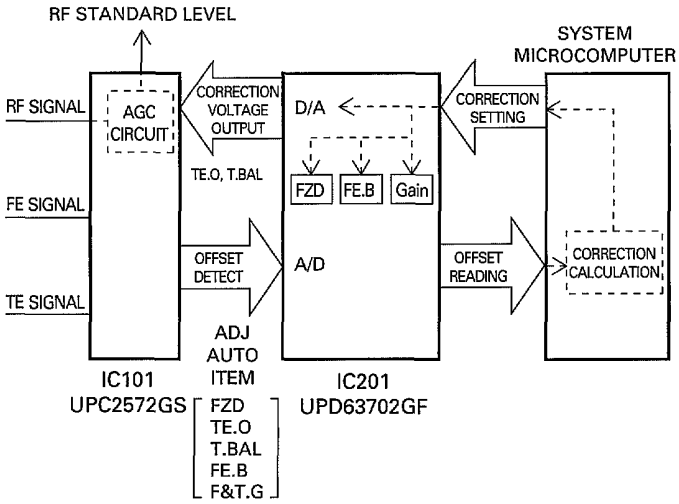


Fig.63 : AUTOMATIC GAIN CONTROL

1) FZD Cancel Setting

This setting is to make the focus closing reliable. When the power is switched on, the FE offset level is read and a voltage opposite to this offset value is written to the CRAM in the IC to cancel the offset. In this way, the FZD threshold level can be set to a constant value (+150mV) and one of the conditions within the IC for focus closing "that the FZD signal is latched at high" can be fulfilled reliably.

2) TE Offset Automatic Adjustment

This function adjusts the pre-amp TE amp offset to 0 V when the power is switched on.

The adjustment procedure is:

(1) The TE offset (LD off) is read by the microcomputer via the servo LSI (offset = TE1).

(2) The microcomputer calculates the voltage to be corrected from the value of TE1 and sets the output of Pin 65 of the servo LSI (signal name: TOFST). The concrete calculation method is as follows.

TOFST2 = TOFST1 + TE1 × R110/R109

3) Tracking Balance Automatic Adjustment

This adjustment equalizes the difference in sensitivity of the E channel and F channel of the TE output. In actual practice, the TE waveform is adjusted to be vertically symmetrical about REFO.

The adjustment procedure is:

(1) After focus closing, the lens is kicked in the radial direction to reliably generate the TE waveform.

(2) At this time, the microcomputer reads the peak and bottom of the TE waveform through the servo LSI.

(3) The microcomputer calculates the value of the offset and the correction voltage to output from Pin 66 of the servo LSI (signal name: TBAL).

(4) The voltage output from the servo LSI is input to Pin 37 of the pre-amp (IC101: UPC2572). This pin is the TEVCA amp control voltage pin. The gain for the E channel and F channel within the pre-amp is varied according to the input voltage to adjust the tracking balance and make the TE waveform vertically symmetrical about REFO.

4) FE Bias Automatic Adjustment

This adjustment is made to maximize the RFI level during play by optimizing the focus point. This adjustment utilizes the phase difference between the RF waveform 3T level signal and the focus error signal. Since an external interference is input into the focus loop, this adjustment uses the same timing as the auto gain control, explained below.

The adjustment procedure is:

(1) External interference is injected into the focus loop by command from the microcomputer (within the servo LSI).

(2) The RF signal 3T component level variation is detected within the pre-amp.

(3) The phase difference between the FE signal due to external interference input and the above 3T component is detected, to sense the focus deviation direction, and the result is output as a DC voltage from Pin 30 (3T-OUT) of the pre-amp.

(4) The 3T-OUT voltage is input to Pin 75 (A/D port) of the servo LSI and the microcomputer reads the 3T-OUT voltage through the servo LSI.
(5) The microcomputer calculates the required correction and adjusts the focus loop offset in the servo LSI.

In the same manner as the auto gain control, this adjustment is repeated a number of times to raise the adjustment precision.

5) Auto Gain Control (AGC)

This adjustment has already been used in the previous generation of CD modules. This function automatically adjusts the focus and tracking servo loop gain.

The adjustment procedure is:

(1) External interference is injected into the servo loop.
(2) The error signals (FE, TE) when the external interference is injected are passed through a band pass filter and the G1 and G2 signals are obtained.
(3) The microcomputer reads the G1 and G2 signals through the servo LSI.
(4) The microcomputer calculates the required correction and adjusts the loop gain within the servo LSI.

To raise the adjustment precision, the same adjustment procedure is repeated a number of times.

6) Initial Adjustment Values

All the automatic adjustments use the previous adjustment value as the initial value as long as the microcomputer power supply is not cut off (the backup is not cut off). If the backup is cut off, automatic adjustment does not start from the previous adjustment value, but rather from the default setting.

7) The Coefficient Display for Adjustment Result

The results of all automatic adjustments can be displayed and checked in test mode.

The coefficient displays for each automatic adjustment are as follows.

(1) FZD cancel, TE.OFST cancel, T.BAL, FE.bias
Reference value = 32 (A coefficient of 32 indicates that no adjustment was necessary).
The display is in units of about 40mV.
Example: FZD cancel coefficient = 35
35-32 = 3 $3 \times 40mV = 120mV$
Since the corrected value is approximately + 120mV, the FE offset before adjustment was - 120mV.

(2) Focus and tracking gain adjustment
Reference value: Focus = 13, tracking = 20
The coefficient display shows the gain derease relative to the reference value.
Example: AGC coefficient = 40
Gain = 20log (20/40) = - 6dB